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AGRICULTURAL
EDUCATION AND
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AAAE 2023 National Conference – Research Manuscript Presentation Schedule

Distinguished Research Manuscript - Monday, May 15 – 3:00-5:30 pm – Grand Ballroom 4 and 5

Discussant: Grady Roberts

Timekeeper – Jason Dosset

Pgs. 12-103

Time	Manuscript Title	Authors
3:30	<i>The State of Agricultural Mechanics in the Preparation of School-Based Agricultural Education Teachers</i>	Tyler Granberry, J. Joey Blackburn, Richie Roberts
3:50	<i>The Emotional Duties of an Agricultural Educator: Evaluating the Confidence Levels of Agricultural Educators to Support Students with Adverse Childhood Experiences</i>	Dr. William Norris, Dr. Shannon Norris-Parrish
4:20	<i>School Based-Agricultural Education Teachers' Lived Experience of Integrating Virtual Reality into their Classroom</i>	Justin Pulley, Amanda Bowling, Dee Jepsen, Tracy Kitchel
4:40	<i>Learning Leadership in a Post-Pandemic Environment: Brokers, Connection, and New Leadership Trajectories</i>	Haley Q. Traini, Natalie Vaz, Jonathan J. Velez
5:05	<i>Exploring the Experiences of Educators in a Practitioner-Oriented Master's Degree</i>	Dr. R. Bud McKendree, Dr. Aaron J. McKim, Olivia M. Hile, Dr. Michael W. Everett
5:20	<i>A Call to Better Qual: A Philosophical and Methodological Examination to Advance Phenomenological Research</i>	Dr. Rebecca Mott, Dr. Becky Haddad

Session A - Tuesday, May 16 – 8:30-10:00 am – Salon D

Discussant: Tre Easterly

Timekeeper – Heather Nesbit

Pgs. 104-169

Time	Manuscript Title	Authors
8:30	<i>SAE for All Implementation in North Carolina</i>	Jillian C. Ford, Dr. Misty D. Lambert
8:53	<i>An Exploration of Consumers' Intent to Engage with Social Media Misinformation Related to Agricultural Hemp and Cannabidiol (CBD)</i>	Dr. Taylor K. Ruth, Dr. Blake C. Colclasure, Dr. Levy G. Randolph, and Dr. Tiffany Rogers-Randolph
9:16	<i>Identifying the Perceptions, Barriers, and Implementation of Middle School Supervised Agricultural Experiences</i>	Christopher J. Eck and R. Jason Davis
9:39	<i>That's Not In My Position Description: A Discourse Analysis of SBAE Migratory Context Abstract</i>	Becky Haddad, Josh Stewart, Jonathan Velez, Haden Botkin, Aaron Miller, Stephanie Godfrie, Ben Myers, Caleb VanZee, John Shellum

Session B - Tuesday, May 16 – 8:30-10:00 am – Salon E

Discussant: Daniel Foster

Timekeeper – Kayla Marsh

Pgs. 170-224

Time	Manuscript Title	Authors
8:30	<i>A Conceptual Paper: Analyzing STEM Integration through AFNR Using Disciplinary Ways of Thinking</i>	Dr. Hui-Hui Wang, Dr. Neil A. Knobloch
8:53	<i>Assessing the Effects of Virtual Cue Implementation in Virtual Reality Welding Training)</i>	Britney Heibel, Dr. Ryan Anderson, Bradley Borges, Dr. Marshall Swafford
9:16	<i>"The lost boys": A case study of male Agricultural Education teacher certification students who changed their career trajectories</i>	Dr. John D. Tummons, Dr. Rebecca Mot, Ms. Rachel Bagnell
9:39	<i>Investigating the Effects of Cognitive Style on Course Motivation for Students' Enrolled in a Team-Based Learning Formatted Introductory Agricultural Mechanics Course at Louisiana State University</i>	Whitney L. Figland-Cook, Dr. Joey Blackburn, Dr. Kristin Stair, Dr. Richie Roberts, Dr. Michael Burnet

Session C - Tuesday, May 16 – 8:30-10:00 am – Salon F

Discussant: Gaea Hock Timekeeper – Kacee James

Pgs. 225-288

Time	Manuscript Title	Authors
8:30	<i>The Resiliency and Thriving of Gay Men in Agricultural Education: A National Mixed Methods Study</i>	Caleb M. Hickman, Dr. Stacy K. Vincent
8:53	<i>Communicating Cooperatively: Exploring Social Media and Online Communication Use of Agricultural Commodity</i>	Rhonda DeLynn Butler, Dr. Courtney Gibson, Dr. Erica Irlbeck, Dr. Courtney Meyers
9:16	<i>THE RAINBOW OWL: A PHENOMENOLOGICAL ANALYSIS OF LGBTQ+ AGRICULTURAL EDUCATION TEACHER EXPERIENCES</i>	Colby Gregg, Dr. Amanda Bowling
9:39	<i>Relationship Between Employee Morale and the Perceived Relationship With Staff Chairs of the Arkansas Cooperative Extension Service Employees</i>	Dr. Sherry Beaty-Sullivan, Dr. Kirk A. Swartzel

Session D – Wednesday, May 17 – 8:30 – 10:00 am – Salon D

Discussant: Brad Coleman

Timekeeper – Ginger Orton

Pgs. 289-352

Time	Manuscript Title	Authors
8:30	<i>Educational Law: How do Superintendents Perceive the Relevance of Educational Law Issues to Agricultural Educators</i>	Dr. William Norris, Dr. Shannon Norris-Parrish, Terrance Crayton
8:53	<i>Teaching Outside of the Margins: School-Based Agricultural Education Teachers' Perspectives on Globally Competent Teaching During an International Experience</i>	Dr. Richie Roberts, Dr. Kristin S. Stair, Whitney Ffigland, Dr. K.S. U. Jayaratne
9:16	<i>Attempts Toward Blended Teaching and Personalized Learning in School-Based Agricultural Education</i>	D. Bret Milliken, Haley Q. Traini, Josh Stewart
9:39	<i>Experiences of Recently Graduated Women School Based Agricultural Education Students</i>	Angus Donaldson, Amber H. Rice

Session E – Wednesday, May 17 – 8:30 – 10:00 am – Salon E

Discussant: Chris Eck

Timekeeper – Katrina Swinehart

Pgs. 353-420

Time	Manuscript Title	Authors
8:30	<i>Gender Representation and Re-Alignment in Agricultural Education: A Historical Analysis of Structural and Cultural Changes</i>	Alexander K. Tingle, Dr. Rebekah B. Epps, Eric M. Moser
8:53	<i>Utilizing Framing Theory to Construct a Typology of Farm to School in Georgia</i>	Jade Frederickson, Dr. Jason Peake
9:16	<i>A Longitudinal Examination of Noncognitive Skills in Secondary Agricultural Education Students Across the COVID-19 Pandemic</i>	Dr. Kasee Smith, Dr. Jeremy Falk, Ms. Claire Bardsley
9:39	<i>Communicating with Prospective Agricultural and Environmental Sciences Graduate Students through a Uses and Gratifications Lens</i>	Allison R. Byrd, Dr. Alexa J. Lamm

Session F – Wednesday, May 17 – 8:30 – 10:00 am – Salon F

Discussant: Jon Ramsey

Timekeeper – Bret Milliken

Pgs. 421- 487

Time	Manuscript Title	Authors
8:30	<i>Exploring Preservice Secondary Agricultural Educator Perceptions of Global Issues Integration into Instruction</i>	Carson Letot, Dr. Daniel Foster, Dr. Kevin Curry, Dr. Melanie Miller Foster
8:53	<i>Fake It Till You Make It? College Students' Perceived Ability Versus Actual Ability to Identify Fake News on Agricultural Topics</i>	Mary Katelynn Horton, Dr. Courtney Gibson, Dr. Laura Fischer, Dr. Todd Chambers
9:16	<i>They don't know Diddly Squat: The influence of Clarkson's Farm on college students' knowledge and perceptions of agriculture</i>	Erica Summerfield, Nicole Volk, Dr. Annie Specht, Dr. Kellie Claffin
9:39	<i>An Investigation of Oregon and Texas Residents' Information Seeking and Processing Behaviors During Extreme Weather Events</i>	Dr. Cara Lawson, Dr. Whitney Stone, Dr. Laura Fischer

Session G – Wednesday, May 17 – 10:30 am – 12:00 pm – Salon D

Discussant: Kim Dooley

Timekeeper – KJ Joseph

Pgs. 488-546

Time	Manuscript Title	Authors
10:30	<i>A Historical Review of Course Requirements in Agricultural Mechanics for Agricultural Education, Teacher Education Undergraduates at Nine 1862 Land-Grant Universities</i>	Kristopher R. L. Rankin III, Dr. M. Craig Edwards
10:53	<i>Inclusion for All? Opportunities and Challenges of Including Students with Diverse Needs in FFA Activities</i>	Mary Kate Morgan Lanier, Dr. Joy Morgan Fleming, Dr. Wendy Warner, Dr. Barbara Kirby
11:16	<i>A Scoping Review on the Impact of Educational Technology in Agricultural Education</i>	Anjorin Ezekiel Adeyemi, Dr. Zhihong Xu, Dr. Rafael Quijada Landaverde, Dr. Ashlynn Kogut, Dr. Mat Baker
11:39	<i>Determining Professional Development Needs of School- Based Agricultural Education Teachers for Working with English Language Learners</i>	Dr. Maggie P. Salem, Dr. Will Doss, Dr. Christopher M. Estep

Session H – Wednesday, May 17 – 10:30 am – 12:00 pm – Salon E

Discussant: Haley Traini

Timekeeper – Amy Lehman

Pgs. 547- 604

Time	Manuscript Title	Authors
10:30	<i>Educational and Life Skill Development and Intrinsic and Extrinsic Returns of Texas 4-H and FFA Livestock Show Projects: Perceptions of County Extension Agents, Agricultural Science Teachers, and Livestock Exhibitor</i>	Dr. Dottie Goebel, Dr. Gary Briers, Dr. Jaehyun Ahn, Dr. Scot Cummings, Dr. Billy Zanolini, Dr. Jeff Ripley
10:53	<i>Using Self-Efficacy Theory to Design Arduino Instruction for Novices: A Replication Study</i>	Donald M. Johnson, Michael L. Pate, Christopher M. Estep, George W. Wardlow
11:16	<i>Experiences from a Land-Based Learning Project Focused on Local Food Interventions</i>	Abbey L. Palmer, Dr. R. Bud McKendree, Dr. Aaron J. McKim, Dr. Phillip Warsaw, Maezie Nettleton, Tiffany Marzolino, Haley Brasier
11:39	<i>Disability Inclusion and Awareness in Youth Livestock Expositions</i>	Regan Culp, Dr. Jonathan Ulmer, Dr. Brandie Disberger, Dr. Gaea Hock

Session I – Wednesday, May 17 – 10:30 am – 12:00 pm – Salon F

Discussant: Robert Strong

Timekeeper – Heather Young

Pgs. 605- 671

Time	Manuscript Title	Authors
10:30	<i>The Validation of the Preservice School-Based Agricultural Education Teacher Dispositions Instrument</i>	Dr. Christopher J Eck, Dr. Kellie Clafflin, Dr. Brooke Thiel
10:53	<i>Using Audience Segmentation to Identify Target Audiences for Climate-Smart Beef Production Communication</i>	Ginger Orton & Dr. Laura Fischer
11:16	<i>Improving Managerial and Leadership Effectiveness in Multistakeholder Organizations</i>	Samuel Ikendi, Michael Retallick
11:39	<i>The Effects of Reflection Mode and Transfer Level on Students' Transfer Skills While Learning Experientially</i>	Bradley M. Coleman, J.C. Bunch., Glenn D. Israel, T. Grady Roberts, Allen F. Wysocki

Session J – Wednesday, May 17 – 2:00 -3:30 pm – Salon D

Discussant: Kirk Swortzel

Timekeeper – Carson Letot

Pgs. 672-733

Time	Manuscript Title	Authors
2:00	<i>Driving Feedback Home: A Hermeneutic Phenomenology of Feedback Patterns Between University Supervisors and Teacher Candidates</i>	Kirby J. Schmidt, Natalie Vaz, Josh Stewart
2:23	<i>Playing the Game: A Case Study of Latinx Leaders in an Agricultural Youth Organization</i>	Graciela Barajas, Dr. Stacy K. Vincent
2:46	<i>You Can't Train Them to Care: Perceptions of [State's] Young Farmers and Ranchers Leadership Group on Necessary Skills for High School Graduates to Gain Entry-Level Employment</i>	Heather L. Young, Dr. R. G. (Tre) Easterly III, Amy M. Brown, Dr. JC Bunch
3:09	<i>One Without the Other: Contextualizing Mobility Through Discourse Analysis</i>	Becky Haddad, Jonathan Velez, Haden Botkin, Josh Stewart, Aaron Miller, Stephanie Godfrie, Ben Myers, Caleb VanZee, John Shellum

Session K – Wednesday, May 17 – 2:00 -3:30 pm – Salon E

Discussant: M'Randa Sandlin

Timekeeper – Jason Dosset

Pgs. 734-802

Time	Manuscript Title	Authors
2:00	<i>Describing Instructional Method Use for Early, Middle, and Late Career Stage School-based Agricultural Education Teachers</i>	Dr. Will Doss, Dr. John Rayfield
2:23	<i>Measuring Mobility: A Quantitative Description of Mobility in Minnesota</i>	Becky Haddad, Lavayne L. Rada, Amy R. Smith
2:46	<i>Exploring the Relationship Between Systems Thinking Tendencies and Green Consumer Values to Inform Innovative Educational Connections</i>	Allison R. Byrd, Kristin E. Gibson, Catherine E. Sanders, Rachel Corry, Dr. Kevan Lamm, Dr. Alexa J. Lamm
3:09	<i>SBAE Induction-Year Teachers' Self-Perceived Professional Development Needs: A Mixed Methods Study</i>	Jessica M. Toombs, Rob Terry, Jr., Jon W. Ramsey, J. Shane Robinson, & Toni A. Ivey

Session L – Wednesday, May 17 – 2:00 -3:30 pm – Salon F

Discussant: Natalie Ferand

Timekeeper – Colby Gregg

Pgs. 803-865

Time	Manuscript Title	Authors
2:00	<i>Perceptions of Pre-service Teachers' Ability to Use AET as a Data Management System</i>	Tyler J. Price, Emily O. Manuel, Emily A. Sewell, J. Shane Robinson
2:23	<i>Suicide and School-based Agricultural Education in the Southern Region – A Multistate Exploratory Study</i>	Drs. Chaney Mosley, Eric Rubenstein, Carla Jagger, Chris Clemmons, O.P. McCubbins, Jason Davis, Ying Jin, Rebekah Epps, Kristin Stair, Dale Layfield, Jon Ramsey, Chris Haynes, Don Johnson, and Edly Santiago
2:46	<i>An Evaluation of U.S. Egg Industry Experts' Perceptions of Alternative Housing Environments: Implications for the Marketing and Communication of Egg Products</i>	Dr. Rexanna Powers Degruy, Dr. Richie Roberts, Dr. Kristin S. Stair
3:09	<i>Does the Mentorship of Cooperating Teachers Meet the Needs of Their Student Teachers? A Mixed-Methods Exploration</i>	Heather Nesbit, Dr. Debra Barry

Session M – Thursday, May 18 – 8:00 – 9:30 am – Salon D

Discussant: Rama Radhakrishna

Timekeeper – Heather Young

Pgs. 866-929

Time	Manuscript Title	Authors
8:00	<i>A Historical Review of Urban Cooperative Extension in the United States with Special Emphasis on the Southern Region</i>	Joshua Campbell, Dr. M. Craig Edwards
8:23	<i>Developing Transformational Learning Tools to Increase Systems Thinking Capacity: Implications for Agricultural Education</i>	Catherine E. Sanders, Allison R. Byrd, Kristin EGibson, Aaron Golson, Dr. Kevan W. Lamm, Dr. Alexa J. Lamm
8:46	<i>Evaluating Youth Leadership Development of 4-H Foods and Nutrition Program</i>	Allison Drabek, Peng Lu, XiIn Li, Julie Gardner, Darlene Locke, Gary Briers, Jun Wang
9:09	<i>Empowering Hidden Voices: A Photo Narration of Community Food Needs By Two Cross-Town Middle Schools in Kentucky</i>	Dr. Stacy K. Vincent, Tori Summey, Katrina Clontz

Session N – Thursday, May 18 – 8:00 – 9:30 am – Salon E

Discussant: Jayaratne Koralalgae

Timekeeper – Hannah Parker

Pgs. 930-988

Time	Manuscript Title	Authors
8:00	<i>Communication Channel Use: Assessing Media Richness as an Approach to Graduate Student Recruitment in a College of Agricultural and Environmental Science</i>	Allison R. Byrd, Dr. Alexa J. Lamm
8:23	<i>Oklahoma School Superintendents Perceptions Toward School-Based Agricultural Education</i>	Christopher J. Eck and Nathan A. Smith
8:46	<i>4-H Extension Educator's Perceptions on Disability Awareness and Inclusion</i>	Regan Culp, Dr. Jonathan Ulmer, Dr. Gaea Hock, Dr. Brandie Disberger
9:09	<i>Perceived Barriers and Resources Needed to Effectively Implement SAE for All</i>	Jillian C. Ford, Dr. Misty D. Lambert

Session O – Thursday, May 18 – 8:00 – 9:30 am – Salon F

Discussant: Katie Sanders

Timekeeper – Tyler Price

Pgs. 989-1051

Time	Manuscript Title	Authors
8:00	<i>An Intersectional Research Synthesis of Multicultural Education Studies</i>	Eric M. Moser, Stacy K. Vincent
8:23	<i>Determining the Needs of School-Based Agricultural Education Teachers in Oklahoma</i>	Kayla N. Marsh, Kristopher Rankin III, Christopher J. Eck, and Nathan A. Smith
8:46	<i>Assessment of Agronomy Extension Education on Farmers' Empowerment Towards Food Production in Rural Uganda</i>	Samuel Ikendi, Francis Owusu, Dorothy Masinde
9:09	<i>Determining the Effectiveness of CASE Professional Development for CASE-certified Agricultural Education Teachers</i>	Anna Bowser, Scot Smalley

The State of Agricultural Mechanics in the Preparation of School-Based Agricultural Education Teachers

Tyler Granberry, The University of Tennessee

J. Joey Blackburn, Louisiana State University

Richie Roberts, Louisiana State University

Abstract

Agricultural mechanics is a primary subject area in school-based agricultural education (SBAE). Despite a high prevalence in SBAE, preservice and in-service SBAE teachers have frequently expressed concerns regarding teaching agricultural mechanics. Early 21st century research documented the characteristics of preservice SBAE teacher training in agricultural mechanics, although more recent studies have suggested that the agricultural mechanics training requirements have changed. This study sought to compare the agricultural mechanics preparation of preservice SBAE teachers between 2000 and 2021. A survey instrument was distributed to a representative of every institution with an undergraduate SBAE teacher preparation program in the contiguous United States, resulting in an 86.7% response rate. The results were compared to previous studies from 2000 and 2005. A reduction in the average number of required agricultural mechanics credit hours was found. Faculty perceptions of importance and preservice teacher preparation had increased slightly; however, deficits were found in all competency groups. Further research is warranted to determine the perceptions of preservice and in-service SBAE teachers regarding agricultural mechanics. Recommendations include that teacher educators evaluate current preparation methods for preservice SBAE teachers and provide professional development in the areas where the greatest training deficits were observed.

Author Note

This manuscript is based on data published in the Proceedings of the Southern Region Conference of the American Association for Agricultural Education, Granberry et al., (2023).

Introduction

In modern school-based agricultural education (SBAE) programs, laboratory instruction has emerged as a principal fixture of formal instruction and often provides students with experiential learning opportunities that help them acquire agricultural-based knowledge and skills (Croom, 2008). As a result, SBAE teachers must have a wide variety of technical skills across agricultural education's diverse curriculum to be considered effective (Albritton & Roberts, 2020; Jenkins et al., 2010; Roberts et al., 2007; Roberts & Dyer, 2004).

For example, agricultural mechanics has been considered a fundamental content area of agricultural education, and dedicated agricultural mechanics facilities have been identified among the most common forms of SBAE laboratories (Phipps, 2008; Shoulders & Myers, 2012; Talbert et al., 2022; Twenter & Edwards, 2017). However, agricultural mechanics as a subject area varies greatly in content and, as a result, demands a high degree of technical skill to be taught effectively (Albritton & Roberts, 2020; Ford et al., 2008). Consequently, of the technical skills deemed necessary for beginning SBAE teachers, Albritton & Roberts (2020) found that 34% were directly related to agricultural mechanics. Despite this importance, first-year SBAE

teachers have ranked agricultural mechanics lower than any other content area in perceived teaching self-efficacy (Burris et al., 2010). Training deficits in agricultural mechanics among SBAE teachers have been well documented, and frequent calls for expanded professional development on the subject are present throughout the literature (Burris et al., 2010; Figland et al., 2019; McKim & Saucier, 2011; Peake et al., 2007; Saucier & McKim, 2011; Saucier et al., 2014; Shultz et al., 2014). Similarly, concerns about teaching agricultural mechanics are present even before SBAE teachers enter the field; for example, empirical evidence has found that agricultural education undergraduates often lack the confidence and skills needed to successfully teach the subject at the secondary level (Blackburn et al., 2015; Granberry et al., 2022; McKim & Saucier, 2013; Saucier & McKim, 2011; Tummons et al., 2017). As such, adequate preparation at the post-secondary level has become more paramount, especially considering Smith et al. (2022) report that illuminated that newly licensed, recent undergraduates accounted for 35.3% of new SBAE teacher hires nationally.

On this point, Hubert and Leising (2000) reported a national average of 6.7 required college credit hours for preservice SBAE teachers. Five years later, Burris et al. (2005) reported the most recent data on preservice teachers' agricultural mechanics training in which they found that 89% of teacher education programs required five or more credits in the area for degree completion, with an average requirement of 9.1 credit hours. However, more recent research has indicated a decline in the number of post-secondary course credits required in agricultural mechanics taken by SBAE instructors (Byrd et al., 2015; McKim & Saucier, 2013). This perceived reduction in post-secondary agricultural mechanics requirements is especially troubling, given the positive impact of enrolling in such courses on the outcomes of preservice teachers, especially concerning the understanding of key concepts and perceived self-efficacy to teach the content (Blackburn et al., 2015; Leiby et al., 2013, Whitehair et al., 2020). Additionally, university faculty who serve as instructors for agricultural mechanics courses have been identified as impactful mentors for preservice and early career teachers regarding teaching the content (Ford et al., 2008; Granberry et al., 2022; Horstmeier & Morgan, 2007). The influence of post-secondary agricultural mechanics instruction on secondary teaching outcomes, coupled with the perception of reduced training in the content area, necessitates an updated study on the level and content of agricultural mechanics coursework available for preservice SBAE teachers.

Theoretical and Conceptual Frameworks

Because laboratory instruction is inherently experiential, the role of experiential learning in coursework involving a high instance of laboratory instruction, such as agricultural mechanics, is paramount. For this reason, John Dewey's ideological lens of experiential learning from his 1938 work *Experience and Education* serves as the overarching theoretical framework for this study. Dewey (1938) saw the role of experience in education as a process by which individuals learn from their overall experiences, reflect, and apply what they have learned to new situations. In Dewey's view, the role of contextualized learning was to provide continuity of experience to the learner, motivating them to continue seeking knowledge and skills. He posited, "Continuity and interaction in their active union with each other provide the measure of the educative significance and value of an experience" (1938, p. 44-45). In the case of agricultural mechanics education for preservice teachers, post-secondary coursework often provides the foundational

experiences necessary to develop the skill sets required for teaching the content to their future students. As the context shifts from the role of a student in a post-secondary course to that of an instructor at the secondary level, the experiential learning derived from prior agriculture mechanics coursework can guide the delivery of agricultural mechanics learning outcomes and bolster interest in further professional development on the topic (Leiby et al., 2013).

Experiential learning also plays a foundational role in Roberts and Ball's (2009) model for agricultural subject matter as content and a context for teaching, which conceptually underpinned the study. The dual goal of the model is to produce life-long learners who are agriculturally literate citizens and a skilled agricultural workforce. However, the model does not conceptualize these outcomes as mutually exclusive. Instead, Roberts and Ball (2009) discussed the complex need for an area of overlap in both parts, "[a]gricultural educators do not have the luxury of defining how students apply what is learned; that is on the student. Further complicating things, high school students likely do not know how they might apply something in the future" (p. 88). In agricultural mechanics education, secondary students' learning outcomes are related to their teachers' knowledge of the content and related technical skills as a base for the integrated curriculum needed to facilitate learning. At its inception, SBAE instruction in agricultural mechanics was designed to train students in the operation, maintenance, and repair of farm equipment they were likely to encounter in their work as farmers and ranchers (True, 1929). However, as agricultural production systems diversified, agricultural mechanics education adapted to include skillsets beyond production machinery, as it was anticipated that SBAE students would need a technical aptitude for both on and off-farm applications (Twenter & Edwards, 2017). More recently, the career outcomes for students in agricultural mechanics-based career pathways can be anticipated in many facets of modern agricultural industries (Hancock et al., 2017). In presenting their model, Roberts and Ball (2009) recognize that SBAE agricultural mechanics coursework has proven to be a valuable context for learning applicable across academic and agricultural disciplines. Due to the role of the SBAE teacher in this process, this study's primary focus was the foundational learning experiences of SBAE teachers in agricultural mechanics in post-secondary teacher preparation programs.

Purpose and Objectives

The purpose of this study was to compare the level of agricultural mechanics preparation of preservice SBAE teachers between 2000 and 2021. Because this study aimed to assess the technical skill development available to students in teacher preparation programs, it aligned with Priority Three of the American Association for Agricultural Education (AAAE) National Research Agenda: Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century (Stripling & Ricketts, 2016). The following research objectives were developed to guide the study:

1. Describe post-secondary institutions offering a four-year undergraduate degree designed to prepare students for careers as SBAE teachers.
2. Describe selected characteristics related to post-secondary instruction in agricultural mechanics.

3. Compare selected characteristics related to post-secondary instruction in agricultural mechanics from 2000, 2005, and 2021.
4. Identify the current perceived level of importance of selected agricultural mechanics content areas for agricultural education graduates.
5. Identify the current perceived level of preparation for agricultural education graduates in selected agricultural mechanics content areas.
6. Compare the perceived level of importance of selected agricultural mechanics content areas for agricultural education graduates from 2005 and 2021.
7. Compare the perceived level of preparation of agricultural education graduates in selected agricultural mechanics content areas from 2005 and 2021.

Methods

This study sought to expand on the research of Hubert and Leising (2000) and Burris et al. (2005) by providing an updated view of the preparation of preservice teachers in agricultural mechanics by evaluating: (a) requirements for degree completion, (b) the content of post-secondary agricultural mechanics courses available to preservice teachers, and (c) perceptions of specific agricultural mechanics topics in teacher preparation programs.

Target Population

All post-secondary institutions offering four-year undergraduate degree programs designed to train SBAE teachers in the United States served as the target population for this study. A list of AAEE member institutions was used as the base of the target population frame (Kleinjan & Marx, 2018). After reviewing the list for frame error, a panel of teacher educators determined that six institutions present on the list did not meet the qualifications for inclusion. Additionally, 11 institutions absent from the AAEE list met the inclusion criteria and were subsequently added to the population frame. After review, the target population was determined to be 103 institutions. Because of the relatively small size of the target population, a census was determined to be the most appropriate sampling method for the study. A representative for each institution was identified and confirmed by a panel of current SBAE teacher educators at Louisiana State University. An effort was made to identify a representative that was a faculty member in the SBAE teacher preparation program and listed as the instructor of at least one course involving agricultural mechanics topics or laboratory management. If no such person could be identified, a faculty member associated with the SBAE teacher preparation program was selected. If no agricultural education faculty were identified, the chair of the department housing the SBAE teacher preparation program was selected to represent the institution.

Instrumentation

The instrument utilized for data collection in this study was a modified version of the instrument developed by Burris et al. (2005). After obtaining an original copy of the instrument, a review was conducted with a panel of three experts to determine necessary alterations to the instrument to align it with this study's objectives. Suggested modifications included adding items designed to collect descriptive data related to the institution, the SBAE teacher preparation program, and items designed to collect data comparable with the findings of Hubert and Leising

(2000). The modified instrument retained all items in the original nine agricultural mechanics content areas included by Burris et al. (2005): *metal fabrication, hand and power tools, project planning and materials selection, electricity, concrete, plumbing, building construction, ag power, and machinery and equipment*; however, *ag power* was renamed *outdoor power equipment and small gasoline engines* to reflect the content more accurately. Changes in wording to some competencies were made for clarity, and new competencies were added where necessary to reflect changes in modern agricultural mechanics technology. New competencies were derived from the Power, Structural, and Technical System (PSTS) Pathway in the Agriculture, Food, and Natural Resources (AFNR) Standards from The National Council for Agricultural Education (2015) and state standards available to the public. Additionally, a tenth content area, *renewable energy*, was added due to the inclusion of the topic in the PSTS Pathway in the National AFNR Standards and modern references for secondary agricultural mechanics (Hancock et al., 2017; Koel et al., 2013; National Council for Agricultural Education, 2015). After all instrument updates were finalized, the ten content areas were represented by 59 competencies, with each content area containing between four and eight competencies.

One section of the instrument asked participants to rate their perception of the 59 competencies' importance on a five-point, Likert-type scale, with one indicating the lowest level of importance and five indicating the highest. Similarly, participants were asked to indicate their perception of the level of preparation that preservice SBAE teachers in their programs received on those same competencies using a similar five-point, Likert-type scale.

Data Collection and Analysis

Data were collected, via Qualtrics, during the Fall 2021 semester. Dillman et al. (2014) tailored design method was used in an attempt to maximize the response rate. An initial email containing a link to the survey was sent to all contacts identified for the target population, followed by three subsequent reminder emails sent at eight-day intervals. A week after the final reminder email, an attempt was made to contact non-respondents by email and phone to clarify correct contact information and ask for participation. If the person initially designated as the contact for a particular institution could not be reached, an attempt was made to contact a different representative for the institution.

When data collection concluded, 94 individuals responded, constituting 91.3% of the original population to whom the survey instrument was distributed. Of the respondents, five representatives indicated that their institutions did not have an undergraduate agricultural education program designed to train SBAE teachers, indicating a small degree of frame error. Consequently, the target population was adjusted from 103 to 98 institutions ($N = 98$) to accommodate the known frame error. Additionally, four respondents indicated they did not wish to participate, and a new representative for those institutions could not be identified. After the frame error adjustment, 85 respondents provided data usable for analysis, constituting a usable response rate of 86.7%. Lindner et al. (2001) concluded that procedures for controlling nonresponse error are not necessary when response rates to surveys are over 85%; therefore, the researchers deemed the response rate acceptable.

The instrument was reviewed for content and face validity by a panel of experts consisting of SBAE teacher educators with experience teaching agricultural mechanics content and faculty with expertise in instrument development. IBM SPSS v.27 was used for post-hoc reliability analysis and descriptive statistics. Cronbach's (1951) alpha values for items measuring perceived levels of importance ranged from .83 to .95. Items measuring perceived levels of preparation yielded values ranging from .83 to .96. The reliability values for all scales were above an acceptable threshold of .70 and similar to those of Burris et al. (2005) study (Field, 2018).

Descriptive statistics were employed to report findings from the data collected for the study. In an attempt to replicate Burris et al. (2005) data analysis methods, two mean values were produced for each of the 59 agricultural mechanics competencies: one for *perceived importance* and one for *perceived level of preparation*. For each of the ten content areas, *perceived importance* and *perceived level of preparation* composite means were generated from the mean values produced from the competencies in that area. These composite means were then compared to the findings of Burris et al. (2005). The researchers note that, although the use of mean values for ordinal data, like the Likert-type scales used for each competency, is not a preferred analysis method, its use in this study was necessary to generate results comparable to the findings of Burris et al. (2005).

Findings

Objective one sought to describe the post-secondary institutions offering a four-year undergraduate degree program designed to prepare students for careers as SBAE teachers. Most ($n = 78$; 91.8%) of the institutions in this study were public colleges or universities, with the largest subgroup of public institutions ($n = 41$; 48.3%) being either 1862 or 1890 Land-grant Universities. Conversely, private colleges and universities made up the smallest group of responding institutions ($n = 7$; 8.2%). The majority ($n = 52$; 61.2%) of institutions had undergraduate student populations greater than 10,000, and almost all operated on semester-based academic calendars ($n = 82$; 96.5%). Although not part of the survey instrument, a comparison of the respondent list with U.S. Department of Education (2020) records indicated that 12 of the institutions represented in the study were designated as *Hispanic-Serving Institutions*. Slightly more than half ($n = 43$; 50.6%) of the responding institutions were in the Southern Region of the AAEE, with the North Central Region constituting slightly less than one-third ($n = 27$; 31.8%) and the Western Region representing the smallest group of respondents ($n = 15$; 17.6%). A total of 964 SBAE teacher preparation program graduates were reported for the 2020-2021 academic year, of whom 853 were reported to have earned teacher certifications. Although the average numbers of students graduating and certifying as teachers were 11.5 and 10.7 respectively, over one-third of the institutions in this study produced five or fewer SBAE graduates ($n = 30$; 35.7%) during the 2020-2021 academic year.

Objective two sought to describe post-secondary instruction in agricultural mechanics for preservice SBAE teachers. Most ($n = 77$; 91.6%) of the institutions in the study offered courses in agricultural mechanics, agricultural technology and equipment, agricultural power, structural, and technical systems, or similarly aligned subjects. Over 70% ($n = 54$; 70.1%) of the institutions

with agricultural mechanics coursework offered those courses in the same academic department as the SBAE teacher preparation program. The most preferred minimum qualifications for an instructor of agricultural mechanics courses for preservice SBAE teachers was a doctoral degree in agricultural education ($n = 37$; 44.0%), or a master's degree in agricultural education ($n = 21$; 25.0%). Of the institutions offering agricultural mechanics courses ($n = 77$), 97.4% required preservice SBAE teachers to complete at least one course, with an average credit hour requirement across all institutions of 5.8. The most common content areas included in required courses were *General Agricultural Mechanics* ($n = 68$; 88.3%) and *Welding / Metal Fabrication* ($n = 56$; 72.7%). Agricultural mechanics teaching methods courses were offered by most ($n = 55$; 64.7%) respondents and required by more than half ($n = 48$; 56.5%). The average number of required agricultural mechanics teaching methods credit hours was 3.6.

This study's third objective sought to compare the characteristics of post-secondary agricultural mechanics instruction for preservice SBAE teachers between 2000 and 2021. The average number of newly certified SBAE teachers increased by 12.63%, from 9.5, as reported by Hubert and Leising (2000), to the current average of 10.7. The current average for required credit hours in agricultural mechanics content ($M = 5.8$) was 13.43% less than the findings of Hubert and Leising (2000) ($M = 6.7$) but was reduced by 36.26% from the findings of Burris et al. (2005) ($M = 9.1$). The average number of required credits in agricultural mechanics teaching methods per program ($M = 2.0$) increased from the findings of Hubert and Leising (2000) ($M = 1.3$). The percentage of respondents with a preference for post-secondary agricultural mechanics instructors with a graduate degree in agricultural education (69.0%) rose from the findings of Hubert and Leising (2000) (34.8%). Similarly, agricultural mechanics courses were more commonly offered in the same department as the SBAE teacher preparation program (70.1%) than the findings of Burris et al. (2005), who reported 57.7%. All agricultural mechanics content areas were more frequently part of the required coursework than the findings of Hubert and Leising (2000); however, only *General Agricultural Mechanics* (2005 – 60.87%; 2021 – 79.22%), *Metal Fabrication* (2005 – 44.93%; 2021 – 54.55%), *Agricultural Mechanics Teaching Methods* (2005 – 37.68%; 2021 – 62.34%), and *Electricity* (2005 – 10.14%; 2021 – 27.27%) displayed increases as the primary course content from the findings of Burris et al. (2005).

Objectives four and five focused on identifying faculty members' perceptions of the importance of agricultural mechanics competency groups and their students' preparation in those groups. Because of the interrelatedness of these objectives, their associated findings are presented concurrently.

The eight metal fabrication competencies ranged in average perceived importance from 3.4 to 4.6. The overall composite mean for all associated competencies ($M = 3.8$; $SD = 0.69$) indicated that metal fabrication was perceived as *important* (see Table 1). Faculty perceptions of preservice SBAE teachers' level of preparation in the metal fabrication competencies ranged in average value from 2.2 to 4.1. The overall composite mean for faculty members' perceptions of preservice teachers' preparation in metal fabrication ($M = 3.3$; $SD = 0.85$) revealed that faculty perceived undergraduates to be *somewhat prepared* in metal fabrication.

The hand and portable power tool group included four competencies that ranged in average perceived importance from 3.3 to 4.7, with a composite mean ($M = 4.3$; $SD = 0.64$) indicating that the competency group overall was perceived as *Important*. Mean perceptions of preservice teachers' level of preparation in hand and portable power tools ranged in average value from 2.2 to 4.4. The composite mean for faculty members' perceptions of preparation related to hand and portable power tools ($M = 3.8$; $SD = 0.72$) designated a perception that preservice teachers were *prepared* in related skills.

Table 1

Comparison of Perceived Importance and Preparation for Competency Groups

Competency Grouping	Burriss et al. (2005) ($n = 69$) Importance		Current Study ($n = 80$) Importance		Burriss et al. (2005) ($n = 69$) Preparation		Current Study ($n = 80$) Preparation	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Metal Fabrication	3.7	0.70	3.8	0.69	3.2	0.98	3.3	0.85
Hand and Portable Power Tools	4.2	0.62	4.3	0.64	3.5	0.95	3.8	0.72
Project Planning and Materials Selection	3.8	0.63	3.8	0.76	2.9	0.91	3.1	0.84
Electricity	4.0	0.70	4.0	0.69	3.1	1.08	3.3	0.92
Concrete	3.7	0.85	3.8	0.91	2.9	1.20	2.8	1.15
Plumbing	3.5	0.93	3.8	0.88	2.7	1.13	3.0	1.09
Building Construction	3.9	0.69	3.9	0.68	3.0	1.04	3.2	0.90
Outdoor Power Equipment and Small Engines	4.1	0.70	4.1	0.68	3.4	1.19	3.6	1.00
Machinery and Equipment	3.6	0.75	3.7	0.79	2.4	1.04	2.6	0.95
Renewable Energy	-	-	3.1	1.05	-	-	2.0	0.96

*Note*¹. Importance Scale: 1 = *Not Important*, 2 = *Of Little Importance*, 3 = *Somewhat Important*, 4 = *Important*, 5 = *Very Important*

*Note*². Preparation Scale: 1 = *Not Prepared*, 2 = *Poorly Prepared*, 3 = *Somewhat Prepared*, 4 = *Prepared*, 5 = *Very Prepared*

The third content area evaluated was Project Planning and Materials Selection, which included seven competencies, ranging from 3.3 to 4.2 in mean perceived importance. The resulting composite mean of ($M = 3.8$; $SD = 0.76$) indicated a perception of *important*. Faculty perceptions of preservice teachers' preparation in the project planning and materials selection competencies ranged in average value from 2.3 to 3.6, with a composite mean ($M = 3.1$; $SD = 0.84$) ranking them as *somewhat prepared*.

Electricity was represented by seven competencies, which ranged in mean perceived importance from 3.2 to 4.6. The composite mean for all competencies in the electricity content

($M = 4.0$; $SD = 0.69$) exhibited a perception of the content as *important*. Perceptions of preparation in the electricity competencies ranged in average value from 2.3 to 4.0, with a composite mean ($M = 3.3$; $SD = 0.92$) indicating that faculty perceived preservice teachers to be *somewhat prepared* in electricity.

The fifth content area analyzed was Concrete, which was distributed across four competencies. All competencies in the concrete content had mean ratings indicating they were perceived as *important*, with values between 3.6 and 4.1. The composite mean for the group of ($M = 3.7$; $SD = 0.85$) was similarly aligned. Faculty perceptions of preparation in the concrete competencies averaged from 2.6 to 3.2, with a composite mean ($M = 2.8$; $SD = 1.15$) disclosing a perception that students were *somewhat prepared*.

Plumbing was represented by four competencies that ranged from 3.4 to 4.3 in average perceived importance. The composite mean for all plumbing competencies ($M = 3.8$; $SD = 0.69$) revealed that participants perceived plumbing as *important*. Faculty perceptions of preservice teachers' preparation in the plumbing competencies ranged from 2.6 to 3.4, with a composite mean ($M = 3.0$; $SD = 1.09$) illustrating that faculty felt preservice teachers were *somewhat prepared* in the content area.

The building construction skill set contained seven competencies, ranging from 3.4 to 4.5 in perceived importance. These values constituted a composite mean ($M = 3.9$; $SD = 0.68$) that expressed faculty perceived the content area as *important*. Perceptions of preparation in the building construction competencies ranged in average value from 2.7 to 3.9, with a composite mean preparation value ($M = 3.2$; $SD = 0.90$) that indicated a perception that students were *somewhat prepared*.

The eighth content area evaluated was outdoor power equipment and small engines, which included six competencies. Faculty perceptions of importance in this area ranged from 3.9 to 4.6, with an overall perception of *important* ($M = 4.1$; $SD = 0.68$). Perceptions of preservice teacher preparation in these competencies averaged from 3.1 to 4.1. These values contributed to a perceived preparation composite mean ($M = 3.6$; $SD = 1.00$) that demonstrated a perception that preservice teachers are *prepared* in this content area.

Perceptions associated with agricultural machinery and equipment were analyzed based on seven competencies. Average perceptions of importance for these competencies ranged from 3.3 to 4.3, with a composite mean ($M = 3.7$; $SD = 0.79$) indicating a perception of *important* for the content area. Perceptions of preservice teacher preparation averaged from 2.2 to 3.3, contributing to a composite mean ($M = 2.6$; $SD = 0.95$) disclosing that faculty felt their students were *somewhat prepared* in the overall content area.

The final content area was renewable energy, which was a new addition to Burris et al. (2005) original instrument and was comprised of five competencies. Faculty members' perceived importance for these competencies averaged between 2.8 and 3.6, with a composite mean for the content area ($M = 3.1$; $SD = 1.05$) revealing that the content area was perceived as *somewhat important*. Faculty perceptions of preservice teachers' level of preparation in the renewable

energy competencies ranged from 1.7 to 2.5, contributing to a composite mean ($M = 2.0$; $SD = 0.69$) that indicated a belief that students were *poorly prepared* in renewable energy content.

Overall, faculty members perceived competencies in *hand and portable power tools* ($M = 4.3$; $SD = 0.64$) as most important. Further, all competencies were perceived as *important*, except for *renewable energy* ($M = 3.1$; $SD = 1.05$), which was perceived as *somewhat important*, leading to its position as least important overall. Similarly, faculty members perceived preservice SBAE teachers as most prepared in *hand and portable power tools* ($M = 3.8$; $SD = 0.72$) and least prepared in competencies related to *renewable energy* ($M = 2.0$; $SD = 0.96$). Average perceptions of *prepared* were present for *hand and portable power tools* and *outdoor power equipment and small engines*. All other content areas were classified as *somewhat prepared* or *poorly prepared*.

Objectives six and seven sought to compare those perceptions to the findings of Burris et al. (2005) (see Table 1). As with the previous two objectives, the findings related to these two objectives are presented concurrently. The greatest increase in *perceived importance* was in *plumbing* (2005 $M = 3.5$; 2021 $M = 3.8$), which exhibited a 9% increase. Additionally, *machinery and equipment* (2005 $M = 3.6$; 2021 $M = 3.7$), *metal fabrication* (2005 $M = 3.7$; 2021 $M = 3.8$), *concrete* (2005 $M = 3.7$; 2021 $M = 3.8$), and *hand and portable power tools* (2005 $M = 4.2$; 2021 $M = 4.3$) all saw increases in perceived importance between 2% and 3%. *Outdoor power equipment and small engines* (2005 $M = 4.1$; 2021 $M = 4.1$), *electricity* (2005 $M = 4.0$; 2021 $M = 4.0$), *building construction* (2005 $M = 3.9$; 2021 $M = 3.9$), and *project planning and materials selection* (2005 $M = 3.8$; 2021 $M = 3.8$) did not exhibit any change in perceived importance.

The greatest increase in *perceived preparation* was also in *plumbing* (2005 $M = 2.7$; 2021 $M = 3.0$), which exhibited an 11% increase. All other competency groups increased in perceived preparation between 6% and 9%, with the exception of *concrete* (2005 $M = 2.9$; 2021 $M = 2.8$), which exhibited a reduction in perceived preparation of 3%.

Conclusions, Discussion, and Implications

This investigation revealed the diversity of preservice SBAE teacher preparation across the nation and presented that agricultural mechanics education in post-secondary settings has become far from uniform. First, the finding that post-secondary agricultural mechanics courses are offered at 91.6% of the institutions training preservice SBAE teachers is both promising and worrisome. This figure suggests that most preservice SBAE teachers in the United States have some access to agricultural mechanics training as part of their SBAE teacher preparation program. In light of the commonality of agricultural mechanics in secondary SBAE, training in the subject area is important (Albritton & Roberts, 2020; Phipps et al., 2008; Shoulders & Meyers, 2012). With the need for training in mind, the percentage of institutions offering agricultural mechanics coursework for preservice SBAE teachers (90.6%) is also troubling. Despite the high number of programs offering agricultural mechanics coursework, at least eight programs are preparing SBAE teachers without content-specific training in agricultural mechanics, which is the most common laboratory environment in SBAE, and requires a high degree of technical competency (Albritton & Roberts, 2020; Twenter & Edwards, 2017).

Beyond the number of institutions without post-secondary agricultural mechanics coursework lies the fact that SBAE teacher training in agricultural mechanics is a well-documented need for both preservice (Burriss et al., 2010; Blackburn et al., 2015; Granberry et al., 2022; Hainline et al., 2018; Saucier & McKim, 2011; Tummons et al., 2017) and in-service teachers (Figland et al., 2019; McKim & Saucier, 2011; McKim & Saucier, 2013; Peake et al., 2007; Saucier et al., 2014; Swafford & Hagler, 2018; Toft et al., 2021; Wells et al., 2021). The accessibility to agricultural mechanics coursework and well-documented training needs in the subject area bolster the conclusion that the amount or the quality of post-secondary agricultural mechanics training is not meeting the needs of the modern SBAE teaching environment.

The findings of this study documented that the average number of credit hours required for preservice SBAE teachers in agricultural mechanics content in 2021 decreased by 13.4% from the findings of Hubert and Leising (2000) but was reduced by 36.3% or 3.3 credit hours when compared to the findings of Burriss et al. (2005). This finding was in alignment with Byrd et al. (2015), Clark et al. (2021), and McKim and Saucier (2013), who observed reduced agricultural mechanics coursework reported by teachers in Iowa and Missouri, respectively. Based on the importance of post-secondary agricultural mechanics coursework to SBAE teachers' perceptions of their ability to teach the content, the overall decline in average required credit hours from 2000 to 2021 is likely a major contributing factor to the widely documented deficit in agricultural mechanics training experienced by SBAE teachers (Blackburn et al., 2015; Leiby et al., 2013, Whitehair et al., 2020).

Despite a reduction in credit hour requirements, this study's findings indicate that preservice teachers' exposure to *general agricultural mechanics*, *metal fabrication*, *agricultural mechanics teaching methods*, and *electricity* have all increased over the past two decades. When combined with a reduction in credit hours, this finding indicates that preservice SBAE teachers frequently encounter a greater breadth of content in a single course. If multiple content areas are being presented in a single course, one must question if preservice SBAE teachers are given enough time with any single content area to gain mastery?

Moreover, how do instructors decide which content to include in the limited credit hours and which to leave out? As a whole, the findings of this study indicate that faculty members perceive agricultural mechanics competencies as important and, compared to Burriss et al. (2005), perceptions of importance have remained stable over time. However, Clark et al. (2021) found that over one-third of Iowa SBAE teachers had no post-secondary instruction in 38 of 54 agricultural mechanics skills, which aligns with this study's findings of low perceptions of preparation. These findings imply that when instructional time is limited, faculty members familiar with the needs of teachers in their state may prioritize content based on local expectations.

In particular, the content area with the lowest level of perceived importance ($M = 3.1$; $SD = 1.05$) and lowest perceived preparation ($M = 2.0$; $SD = 0.96$) was renewable energy. The findings related to renewable energy are troubling, considering that non-hydroelectric renewable energy sources are projected to be the fastest-growing forms of energy generation in the U.S., and the domestic production and use of biofuels is expected to increase through 2050 (U.S.

Energy Information Administration, 2021). Additionally, the Bureau of Labor Statistics (2021) indicated that wind turbine service technicians and solar photovoltaic installers rank first and third, respectively, as occupations with the highest projected growth by 2029, with the boom in renewable energy showing instances of carry-over to agricultural industries (Hancock et al., 2017).

Overall, when comparing perceived importance to perceptions of preservice teacher preparation, all competency groups had an average perception of importance greater than the average perceived level of preservice teacher preparation, exhibiting only marginal changes from the findings of Burris et al. (2005). Based on these findings, it appears many SBAE teacher educators have become aware that they were operating in an extended agricultural mechanics training deficit. Why, then, have SBAE teacher preparation programs not altered their requirements to include more agricultural mechanics content if training needs are known? The answer is most likely the result of pressure on post-secondary leaders to reduce the number of credits for degree completion, with 120 credit hours now the standard for most four-year undergraduate degrees (Johnson et al., 2012). While students may have the opportunity to enroll in courses beyond those required for their degree plan, many states and institutions have adopted excess credit hour policies that place punitive surcharges on students who exceed the credit hour recommendations of their degree plans (Kramer et al., 2018). Although these measures were meant to reduce the time to degree completion and improve graduation rates, it appears that they have particularly affected SBAE teacher preparation in the form of agricultural mechanics coursework reduction.

The combination of the highly technical nature of agricultural mechanics and the reduced credit hours for preservice teachers in the content area has created an evident issue. Preservice teachers have frequently expressed concerns regarding their self-efficacy in teaching agricultural mechanics (Burris et al., 2010; Granberry et al., 2022; Hainline et al., 2018; Tummons et al., 2017). The findings of this study display that, based on faculty perceptions, preservice and, consequently, early career teachers need training in multiple content areas under the agricultural mechanics umbrella, which aligns with recent needs assessments (Wells & Hainline, 2021). With current limitations to degree plans, SBAE teacher educators should determine if expanded coursework is possible and, if not, should seek to integrate agricultural mechanics content into existing agricultural education courses. Additionally, teacher educators should attempt to facilitate agricultural mechanics professional development for SBAE teachers, especially in content where they perceive training deficits. Despite training needs, SBAE teachers are continuing to teach agricultural mechanics. Therefore, research is warranted to determine where SBAE teachers are acquiring agricultural mechanics knowledge and skills and measure the effectiveness of those sources. If specific forms of highly effective professional development can be identified to build agricultural mechanics skills, such information would prove invaluable to teacher educators. Finally, because of the noted variations between previous studies and the findings of this study, the researchers recommend that a national study of the preparation of preservice teachers in agricultural mechanics be replicated periodically to identify patterns in post-secondary instruction better.

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The Emotional Duties of an Agricultural Educator: Evaluating the Confidence Levels of Agricultural Educators to Support Students with Adverse Childhood Experiences

Abstract

Agricultural and vocational educators can have one of the most profound impacts on students' lives. Students often treat their agricultural educator as a mentor, which increases the likeliness of confiding in them when facing hardships, such as Adverse Childhood Experiences (ACEs). Adults with ACEs are more prone to violent crime, drug use, poverty, and unemployment. The purpose of this study was to evaluate agricultural educator's personal experiences with ACEs and gauge their confidence levels when emotionally supporting students struggling with ACEs. Using a descriptive, correlational research design, we surveyed 1,075 agricultural educators in four states—Tennessee, Utah, North Dakota, and Illinois—and achieved a 11.91% response rate. Nearly half (50.2%) of respondents had at least one ACE experience, and 10.2% had at least four. Agricultural educators reported the least confidence in emotionally supporting students with issues related to physical or sexual abuse and reported the most confidence supporting students struggling with mental health or parental divorce. This study reinforces the drastic need for agricultural education to increase programmatic development to support students and teachers facing emotional trauma and ACEs. We recommend investigating the benefits of CTE, both academically and emotionally, for students with high ACE scores.

This manuscript is based on data presented at the Southern Region Conference of the American Association for Agricultural Education (Norris & Norris-Parrish, 2023).

Introduction

Agricultural education can be a rewarding and fulfilling vocation. The opportunity to motivate students through leadership skills, assist them in developing a passion for the agricultural industry, and guide them to success in their chosen career paths is a worthwhile element of the profession for many educators. Agricultural education and vocational professions often allow educators to have one of the closest and most profound impacts on students' lives (Watson et al., 2015). Many times, because agricultural educators spend a disproportionately large amount of time with students when compared to teachers from other disciplines, agricultural educators often have the opportunity to make strong, personal connections with their students (Bird et al., 2013). While these duties may be the part of the typical agricultural educator's job description, there are instances where it is necessary and appropriate to emotionally support students in a professional manner (Murphey & Sacks, 2019).

Many times, students treat their agricultural educator(s) as mentors and friends, which can often result in teachers becoming more aware of the students' experiences away from the school setting (Bird et al., 2013). This level of vulnerability can increase students' likeliness to confide in their agricultural educator when facing hardships or difficult struggles, such as Adverse Childhood Experiences (ACEs; Center for Disease Control [CDC], 2022). Blodgett and Lanigan (2018) stated that "understanding and responding to a child's ACE profile might be an important strategy for improving the academic trajectory of at-risk children" (p. 2). However,

minimal research has been conducted gauging an agricultural educator's level of preparedness or confidence when interacting and teaching students with ACEs.

In adolescence, many psychosocial functions are formed, and cognitive development is in transition to adulthood (Silverman & Hinshaw, 2008). ACEs can be a barrier to healthy cognitive development due to the high level of stress found in the brain when the individual experiences the ACE (Gilbert et al., 2015; Goodman, 2017; Petruccelli et al., 2019). As a result, ACEs can potentially be traumatic events when occurring during childhood (0–17 years old; CDC, 2022). According to the CDC (2022), 61% of adults have experience with at least one ACE and nearly 17% have personal experience with four or more ACEs.

The effects of ACEs can be substantial (CDC, 2022). Adults with these types of experiences are more prone to violent crime, drug use, poverty, and unemployment (Petruccelli et al., 2019). Agricultural educators are often the emotional supporters for students experiencing these types of traumatic experiences. Furthermore, students that have high occurrences of ACEs are drawn to Career and Technical Education (CTE; Houtepen et al., 2020). Evaluating agricultural educators' confidence levels to adequately support students with ACEs will help ascertain their preparation levels to support these students.

Purpose and Objectives

The purpose of this study was to evaluate agricultural educator's personal experience with ACEs and the confidence levels of agricultural educators to emotionally support students who struggle with ACEs.

The following research objectives guided this study:

1. Describe agricultural educator's personal experiences with ACEs.
2. Evaluate agricultural educator's confidence levels to emotionally support students with high ACE scores.

Theoretical Framework

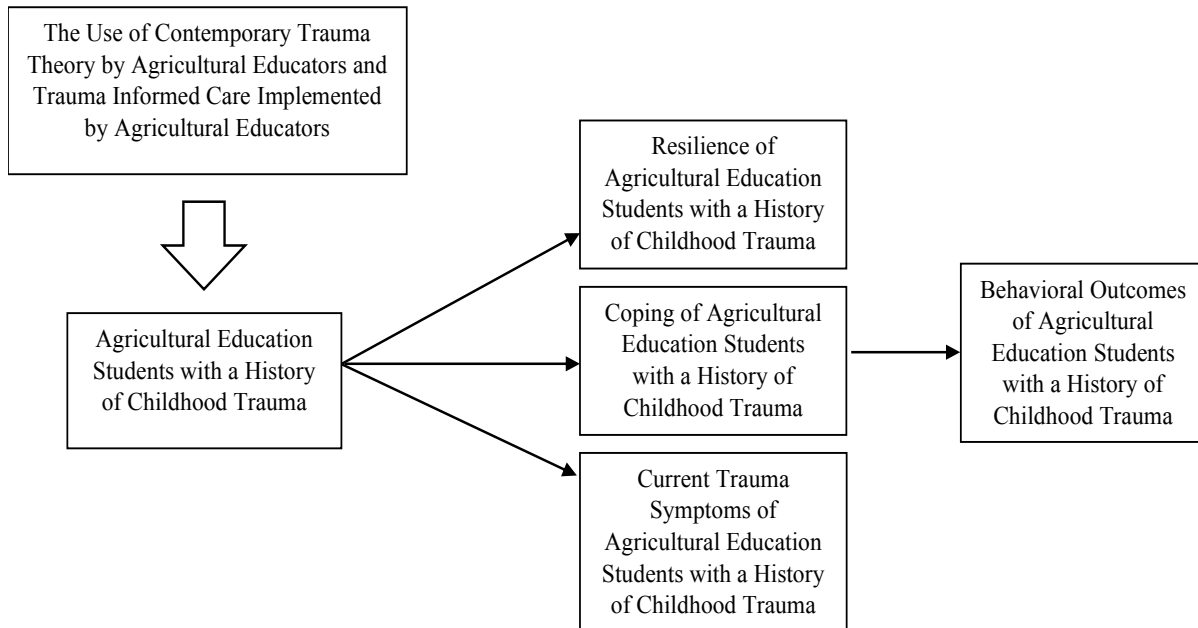
The Contemporary Trauma Theory was used as the theoretical framework for this study (Goodman, 2017). This theory aims to provide a lens into the effect of trauma on psychosocial functions and how trauma informed support ultimately influences the behavior of the afflicted (Goodman, 2017). Furthermore, this theory depicts how resilience, coping, and the current trauma symptoms of the afflicted impact their behavior.

ACEs can be a barrier to cognitive development; however, through the Contemporary Trauma Theory, investigating this barrier will assist educators in emotionally supporting students experiencing these situations (Goodman, 2017). Agricultural educators are often in positions to positively affect students who are in these overwhelmingly negative situations. This is particularly true because students with high ACE scores are often drawn to CTE (Houtepen et al., 2020). Assessing agricultural educator's personal experiences with ACEs and their

confidence levels to emotionally support students with high ACE scores will provide insight into the preparation levels of agricultural educators to support these students.

Figure 1

Contemporary Trauma Theory in Agricultural Education, adapted from Goodman, 2017



Method

We used a descriptive correlational research design. Descriptive correlational research studies describe the relationships between variables rather than causal factors (Lappe, 2000), which best suited the research objectives of the study. The research instrument consisted of two sections. Section one measured the personal childhood experiences of agricultural educators and the confidence levels of agricultural educators to support students with ACEs, and section two measured demographic data.

Population

A census approach was utilized to survey agricultural educators in four states—Tennessee, Utah, North Dakota, and Illinois. To develop the frame for the study, we purposively selected one state from each National FFA region (National FFA Organization, 2023) to gauge a broad geographical representation from states with varying FFA membership sizes. Each selected state also had an accessible online listserv that allowed us to invite them to participate in the study in a non-clinical setting via email. The compiled list contained viable email addresses for 349 agricultural educators in Tennessee, 159 in Utah, 64 in North Dakota, and 503 in Illinois (N = 1,075).

Table 1*Demographic Data of Participating Agricultural Educators*

Demographic Area	Demographic Sub-Area	Participants	
		<i>f</i>	%
Gender	Female	67	54.9
	Male	55	45.1
Race	White/Caucasian	119	97.6
	Black/African American	1	0.8
	Other	2	1.6
Highest Degree Earned	No Degree	1	0.8
	Associates	3	2.5
	Bachelor's Degree	64	52.9
	Master's Degree	48	39.7
	Specialist	1	0.8
Teacher Certification	Doctoral	4	3.3
	Traditional Certification	105	82.0
	Alternative Certification	18	14.1
School System Type	Other	5	3.9
	City School System	42	34.7
	County School System	53	43.8
Size of Agricultural Department	Other	26	21.5
	1 Teacher	62	51.2
	2 Teachers	40	33.1
	3 Teachers	13	10.7
Relationship Status	4+ Teachers	6	5.0
	Married	82	67.8
	Relationship but not Married	12	9.9
	Divorced/Widowed	7	5.8
Length of Teaching Contract (With State Sponsored Days)	Single	20	16.5
	9 Month	12	9.9
	10 Month	15	12.4
	11 Month	9	7.4
	12 Month	79	65.3
Coach a Sport	12 Month +	6	5.0
	Yes	10	8.3
Teaching Other Subjects Besides Agricultural Education	No	111	91.7
	Yes	31	25.6
	No	90	74.4

Note. Retained partial responses caused the *n* to vary in some demographic categories. These figures represent participants from the four selected states— Tennessee, Utah, North Dakota, and Illinois.

The most notable demographic areas in the study (Table 1) included 54.9% ($f = 67$) of the population being female agricultural educators and 97.6% ($f = 119$) being white or Caucasian. Furthermore, 92.3% ($f = 112$) of assessed educators had a bachelor's or master's degree as their highest degree earned and 84.3% ($f = 102$) taught in a one or two teacher agricultural education department. In addition, 43.8% ($f = 50$) taught in a self-reported rural school system and 82.0% ($f = 105$) received their teacher certification through traditional routes. Overall, 67.8% ($f = 82$) of participants were married, 70.3% ($f = 85$) were on a 12-month contract or better, 91.7% ($f = 111$) did not coach a sport, and 74.4% ($f = 90$) only taught agricultural education.

Instrumentation

The instrumentation included two sections. First, we investigated the personal childhood experiences of agricultural educators using the ACEs questionnaire, which was adapted from the official ACEs survey developed by the World Health Organization (WHO, 2018; see Table 2). The ACEs questionnaire consisted of 10 items seeking “Yes” or “No” responses. For every question where participants answered “Yes,” one point was added to their ACE comprehensive score. Participants had the possibility to reach a maximum score of 10. To begin the questionnaire, we asked participants to think back to their personal experiences and disclose as much information as they felt comfortable but would remain anonymous and confidential.

We also investigated the confidence levels of agricultural educators to emotionally support students who are facing, have faced, or may face any of the 10 ACE circumstances using a five-point, Likert-type scale (1 = *Not Confident at All*; 2 = *Somewhat Confident*; 3 = *Moderately Confident*; 4 = *Very Confident*; 5 = *Extremely Confident*).

In the second section of the instrument, we designed demographic questions to describe participants' gender, race, highest degree earned, type of teacher certification received, school system type, size of agricultural department, relationship status, length of teaching contract, involvement with coaching secondary sports, and teaching expectations beyond agricultural education. Each of these demographic questions were designed to gain a deeper understanding of the educator's potential exposure to ACE scenarios within their school setting.

Table 2

Adverse Childhood Experiences (ACEs) Questionnaire

Question #1	Did a parent or other adult in the household often: Swear at you, insult you, put you down, or humiliate you? Or act in a way that made you afraid that you might be physically hurt?
Question #2	Did a parent or other adult in the household often: Push, grab, slap, or throw something at you? Or, ever hit you so hard that you had marks or were injured?
Question #3	Did an adult or person at least 5 years older than you ever: Touch or fondle you or have you touch their body in a sexual way? Or, attempt or have sexual intercourse with you?
Question #4	Did you often feel that: No one in your family loved you or thought you were important or special? Or your family didn't look out for each other, feel close to each other, or support each other?
Question #5	Did you often feel that: You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? Or your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Question #6	Were your parents ever separated or divorced?
Question #7	Were any of your parents or other adult caregivers: Often pushed, grabbed, slapped, or had something thrown at them? Or sometimes or often kicked, bitten, hit with a fist, or hit with something hard? Or ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
Question #8	Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?
Question #9	Was a household member depressed or mentally ill, or did a household member attempt suicide?
Question #10	Did a household member go to prison?

Note. These Adverse Childhood Experiences (ACEs) questions (WHO, 2018) were adapted to for agricultural educators.

Validity and Reliability

We measured the survey instrument with post hoc reliability, which deemed the instrument suitable for this study. The scale had a high reliability coefficient, using Cronbach's alpha, for scales measuring confidence levels of agricultural educators to emotionally support students with ACEs scores at .960. The reliability threshold for a quality analysis is .70 (Gliem & Gliem, 2003).

Data Collection

A list of agricultural educators was compiled using resources from the four state's online agricultural educator directories. Each state's listserv included the name of the agricultural educators and their email address. Using each state's online directories, we invited each educator directly to participate in the study. Upon the first invitation email, we sent periodic reminder emails to increase response rates (Dillman et al., 2014). Due to reporting mistakes in the agricultural educator online directories, frame error is a possible limitation of the study (Zhengdong, 2011). Nevertheless, we used a census approach in this study to increase the response rate attempt to mitigate the sample frame error.

We collected data using a census approach to alleviate sampling bias. Gay and Diehl (1992) suggested that a 10% response rate was needed for sound descriptive research. We achieved a response rate of 11.91% ($n = 128$). We retained partial responses of participants who completed the instrument but not the demographics, and we achieved ($n = 121$) full responses and ($n = 7$) partial responses. Baruch (1999) observed that response rates have declined over time, which is also consistent with findings from Mavis and Brocato (1998) that determined that electronic survey methods yield lower response rates. Nevertheless, because this study used a census approach, the findings should not be generalized past the participants assessed.

Data Analysis

To analyze research objectives one and two, we used central tendencies through frequencies and percentages, and all analysis occurred using SPSS Version 28.0. To assess non-response bias and early/late response bias, we used a Multivariate Analysis of Variance (MANOVA) to compare differences (Lindner et al., 2001). To mitigate non-response bias, we sent four emails over a two-week period to recruit new participants. To determine nonresponse bias, participants who responded to the first two emails were considered early respondents ($n = 71$), and participants who responded to the third email were considered late respondents ($n = 57$). After analyzing for non-response bias and early/late response bias, we found no statistical differences.

Results

Research Objective One

The first research objective aimed to evaluate agricultural educator's personal experiences with ACE circumstances (see Table 3). Of the 128 total responses, 50.8% ($f = 65$) of

respondents had at least one ACE experience, and 10.2% ($f = 13$) had at least four ACE experiences.

Table 3

Personal Childhood ACE Experiences of Agricultural Educators

	Yes	%	No	%
Question #1	32	25.0 %	96	75.0 %
Question #2	16	12.5 %	112	87.5 %
Question #3	11	8.6 %	117	91.4 %
Question #4	15	11.7 %	113	88.3 %
Question #5	4	3.1 %	124	96.9 %
Question #6	24	18.8 %	104	81.2 %
Question #7	8	6.3 %	120	93.8 %
Question #8	19	14.8 %	109	85.2 %
Question #9	30	23.4 %	98	76.6 %
Question #10	0	0.0 %	128	100.0 %

Note. These questions represent 10 Adverse Childhood Experiences (ACEs) that the educator may have experienced in the past.

The most common ACE experience was Question #1, “Did a parent or other adult in the household often: Swear at you, insult you, put you down, or humiliate you? Or act in a way that made you afraid that you might be physically hurt?”. Approximately 25.0% ($f = 32$) of agricultural educators had experience with this ACE scenario. The second most common ACE experience was Question #9, “Was a household member depressed or mentally ill or did a household member attempt suicide?”. Of the participating agricultural educators, 23.4% ($f = 30$) answered yes. The third most common ACE experience was Question #6, “Were your parents ever separated or divorced?”. Twenty-four (18.8%) agricultural educators said yes.

Research Objective Two

The second research objective aimed to assess the agricultural educator’s confidence in emotionally supporting students who had various encounters with ACE experiences (see Table 4). Within each ACE question, some variance appeared in the confidence levels of agricultural educators. The ACE experience that agricultural educators had the least confidence in emotionally supporting students with was Question #3, “Did an adult or person at least 5 years older than you ever: Touch or fondle you or have you touch their body in a sexual way? Or attempt or have sexual intercourse with you?”. Seventy-three (59.8%) agricultural educators claimed to either have no confidence or be somewhat confident in emotionally supporting a student with ACE experience, and only 16.4% ($f = 20$) of agricultural educators claimed to be either very confident or extremely confident.

Table 4*Confidence of Agricultural Educators to Emotionally Support Students with ACEs*

	No Confidence	Somewhat Confident	Moderately Confident	Very Confident	Extremely Confident
Question #1	6 (4.9%)	39 (32.0%)	48 (39.4%)	22 (18.0%)	7 (5.7%)
Question #2	13 (10.7%)	38 (31.1%)	46 (37.7%)	19 (15.6%)	6 (4.9%)
Question #3	35 (28.7%)	38 (31.1%)	29 (23.8%)	16 (13.1%)	4 (3.3%)
Question #4	6 (4.9%)	40 (32.8%)	42 (34.4%)	27 (22.1%)	7 (5.7%)
Question #5	6 (4.9%)	39 (32.0%)	42 (34.4%)	27 (22.1%)	8 (6.6%)
Question #6	4 (3.3%)	20 (16.4%)	40 (32.8%)	39 (32.0%)	19 (15.6%)
Question #7	20 (16.4%)	38 (31.1%)	42 (34.4%)	17 (13.9%)	5 (4.1%)
Question #8	9 (7.4%)	44 (36.1%)	37 (30.3%)	24 (19.7%)	8 (6.6%)
Question #9	9 (7.4%)	38 (31.1%)	44 (36.1%)	21 (17.2%)	10 (8.2)
Question #10	9 (7.4%)	44 (36.1%)	39 (32.0%)	20 (16.4%)	10 (8.2%)

Note. The scales are listed by *frequency* (percentage) and reported using a five-point, Likert-type scale (1 = *No Confidence*; 2 = *Somewhat Confident*; 3 = *Moderately Confident*; 4 = *Very Confident*; 5 = *Extremely Confident*).

The ACE question that participants had the most confidence in emotionally supporting students with was Questions #6, “Were your parents ever separated or divorced?”. Fifty-eight (47.6%) agricultural educators reported being very confident or extremely confident in supporting students with this ACE, and only 19.7% ($f = 24$) reported having no confidence or being somewhat confident. The ACE question that agricultural educators had the second most confidence in supporting was Question #5, “Did you often feel that: You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you? Or your parents were too drunk or high to take care of you or take you to the doctor if you needed it?”. Thirty-five (28.7%) agricultural educators reported very confident or extremely confident in supporting students who struggle with this ACE; however, 36.9% ($f = 45$) of agricultural educators reported having no confidence or only being somewhat confident in supporting these students.

The ACE question that agricultural educators had the second least amount of confidence in emotionally supporting students was Question #7, “Were any of your parents or other adult caregivers: Often pushed, grabbed, slapped, or had something thrown at them? Or sometimes or often kicked, bitten, hit with a fist, or hit with something hard? Or ever repeatedly hit over at least a few minutes or threatened with a gun or knife?”. Only 22 (18.0%) agricultural educators claimed to be very confident or extremely confident in emotionally supporting students facing these types of situations. Furthermore, 47.5% ($f = 58$) claim to either have no confidence or be somewhat confident in emotionally supporting these students.

Conclusions and Recommendations

Agricultural and vocational education provide opportunities for educators to have one of the most profound impacts on students’ lives. However, it is vital to equip their ability to support

students who face serious life challenges, and sometimes, life-threatening circumstances, through ACEs. Blodgett and Lanigan (2018) shared that ACEs have profound and lasting impacts on children and youth. Therefore, equipping educators with resources to emotionally support students and connect them with the appropriate resources could be as serious as saving a student's life. It could also help with the emotional toll an educator may experience as they support students who have experienced, who are experiencing, or who may experience ACEs (Houtepen et al., 2020).

The first research objective investigated agricultural educators' personal experiences with ACEs, and the second research objective evaluated agricultural educators' confidence in emotionally supporting these students. Overall, agricultural educators feel somewhat confident to moderately confident in emotionally supporting these students. Agricultural educators felt the least confident in emotionally supporting students with issues related to physical or sexual abuse (e.g., ACE Questions #2, #3, and #7; WHO, 2022). Additionally, agricultural educators felt the most confident in assisting students with issues related to mental health and parental divorce or separation (e.g., ACE Questions #6 and #9).

Because the results from this study are consistent with findings from Atwood et al. (2022) and Gallagher-Butler (2021), we recommend providing training opportunities to adequately support students with ACEs, specifically related to physical, emotional, or sexual abuse. While agricultural educators are not, and should not be treated as, trained counselors or psychologists, they are often a comforting figure in the lives of these students. Therefore, we also recommend providing extensive training to agricultural educators and vocational teachers regarding counseling services, medical facilities, or emergency support hotlines.

This study reinforces the drastic need to equip agricultural educators to emotionally support students who struggle with ACEs (Murphey & Sacks, 2019). Because students with high ACE scores are drawn to CTE courses (Houtepen et al., 2020), we further suggest increased program development to support agricultural educators who are mentoring and supporting students who have faced or currently face emotional trauma. As individuals with high ACE scores can be more prone to violent crime, drug use, poverty, and unemployment (Petrucci et al., 2019), we also suggest building programming efforts in agricultural education courses to support teacher development. Finally, we recommend investigating the benefits of CTE, both academically and emotionally, for students with high ACE scores.

One possible limitation of the study is the sensitive nature of the self-disclosed data. As a result, the data may not be the most accurate reflection of personal experiences for several reasons, including the participants choosing not to disclose personal information, varying interpretations of ACE events that happened in the past, and memory barriers related to trauma (Blodgett & Lanigan, 2018). Nevertheless, it is vital that agricultural educators have the confidence to support students who have ACEs experiences, and the background and resources to direct students for treatment and help.

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School Based-Agricultural Education Teachers' Lived Experience of Integrating Virtual Reality into their Classroom

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School-Based Agricultural Education (SBAE) uses a combination of classroom and laboratory instruction, experiential learning, and leadership education to prepare students for jobs in industry. With the recent promotion of Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) as an option for educational programs, this technology allows teachers to incorporate experiential learning and give students real experiences who otherwise might not have the opportunity. VR has been used across many industries, such as medicine, construction, manufacturing, military training programs, tractor and machinery operation, as a form of training. The purpose of this qualitative study was to explore Ohio SBAE teachers lived experiences of incorporating a VR experience and technology into their curriculum. Eleven teachers participated in semi-structured interviews to describe their lived experiences. Three themes and 11 sub-themes emerged from those results. Participants described their experience as one that provided valuable benefits, introduced new challenges, and a semi-realistic interpretation of a hands-on activity. Teachers offered recommendations for how VR can be successfully integrated into skill-based instruction by ensuring that teachers have administrative and IT support, compliments the learner's coursework and provides a realistic interpretation of a hands-on activity.

Introduction and Literature Review

Career and Technical Education (CTE) provides the connection for students between secondary and post-secondary learning and acquisition of skills for their later careers (Adamuti-Trache et al., 2020; Stone, 2014). School-Based Agricultural Education (SBAE), one of the disciplines in CTE, uses a combination of classroom and laboratory instruction, experiential learning, and leadership education to prepare students for jobs in the agricultural industry (NAAE, 2022). Experiential learning is a common educational practice employed throughout SBAE (Coleman et al., 2021; Roberts & Ball, 2009; Shoulders & Myers, 2013). Roberts (2006, p. 26) defined experiential learning “as a process or by the context in which it occurs.” His model of Experiential Learning Contexts explained that experiential learning could occur across four dimensions: the level, duration, intended outcome, and the setting (Roberts, 2006). Virtual Reality (VR) can be introduced in the learning environment to provide an alternative and unique setting for experiential learning by immersing users in the content (Pellas et al., 2021).

The foundation of VR, and its associated technologies, Augmented Reality (AR) and Mixed Reality (MR), are all based on “a three-dimensional, computer-generated environment which can be explored and interacted with by a person” (Virtual Reality Society, 2017, p. 5). Virtual reality uses a fully immersive environment and technology to engage the user in the experience. Augmented reality is the least immersive of the three and uses technology such as a smartphone to overlay an environment that can be interacted with through the phone. Mixed reality is a mixture of the other realities; it allows the user to interact with accurate equipment in an immersive environment, such as a driving simulator.

These technologies are options for teachers who wish to incorporate experiential learning and give students real experiences who otherwise might not have the opportunity. Johnson (2010, p. 22) stated, “AR has strong potential to provide both powerful contextual, on-site learning experiences and serendipitous exploration and discovery of the connected nature of information in the real world.” Lamb and Etopio (2019) found that a preservice teacher experience promoted learning from modeled real-life situations for the transfer of theory into practice. Further, students immersed in a virtual learning environment before the start of an online literacy course reported positive perceptions and valued the use of the virtual environment (Domingo & Bradley, 2018). Liarakapis et al. (2004) demonstrated that AR can make complicated mechanisms and difficult theories in higher education accepted and understood by students. Positive experiences and applications have been reported in several educational settings, paving the way for VR to enter other disciplines as a training method.

Virtual reality has been used across many industries as a form of training, such as medicine, pedestrian safety, construction, manufacturing, military training programs, and preservice teacher preparation. For example, experienced surgeons who had prior experience with VR training were significantly faster and used significantly less contrast fluid than the inexperienced group (Aggarwal et al., 2006). Further, a construction training reported that workers showed a significant difference between pre and post-tests in hazard identification and prevention (Sacks et al., 2013). The mining industry uses VR to reduce work related injuries and as a result a range of equipment simulators are available commercially (Tichon & Burgess-Limerick, 2011). With the use of VR across multiple industries, the need for accurate and realistic experiences has become the main concern.

When a VR experience is not sufficiently realistic, it can detract from the students' ability to learn. Kavanagh et al. (2017) found that in a synthesis of research, 20% of the studies reported VR systems providing an insufficiently realistic experience. This accounted for 26.9% of the total output problems reported (Kavanagh et al., 2017). Other studies reported that VR users found their implementations to be insufficiently realistic, and researchers worried that this may detract from the learning experience (Huang et al., 2010; Lee et al., 2010). Further, when users were not familiar with the technology it affected their sense of presence and created an unrealistic experience (Gisbergen et al., 2019; Lombard & Ditton, 1997). Schwaab et al. (2011), for example, designed a VR system to simulate mock medical emergency oral examinations. While most of the students reported they preferred the VR system to the traditional approach, several also claimed it did not really reflect their practical experience and would therefore provide limited benefit to their learning, even though one safety education-based study showed 3D VR was more effective than a lecture-only delivery method and equally comparable to a lecture with a physical laboratory (Nakayama, 2014). Lastly, visual and graphic limitations to the devices can exist providing low pixel density, image latency, and other limiting sensory factors (Cuccurullo et al., 2010; Hsiao et al., 2010; Shafer et al., 2019).

Currently, the use of VR in SBAE has been focused in VR welding trainings. Wells and Miller (2022) found that students in an agricultural mechanics course experienced alignment between the VR welding system and live welding, and that it had utility as tool for teaching and learning. Further, Wells and Miller (2020) found that VR neither improved or detracted from students' weld scores and VR welding has shown that in some cases students in a VR integrated welding group outperformed the traditional welding groups (Stone et al., 2011). Virtual reality welding has begun to pave the way for other VR applications to be used within SBAE.

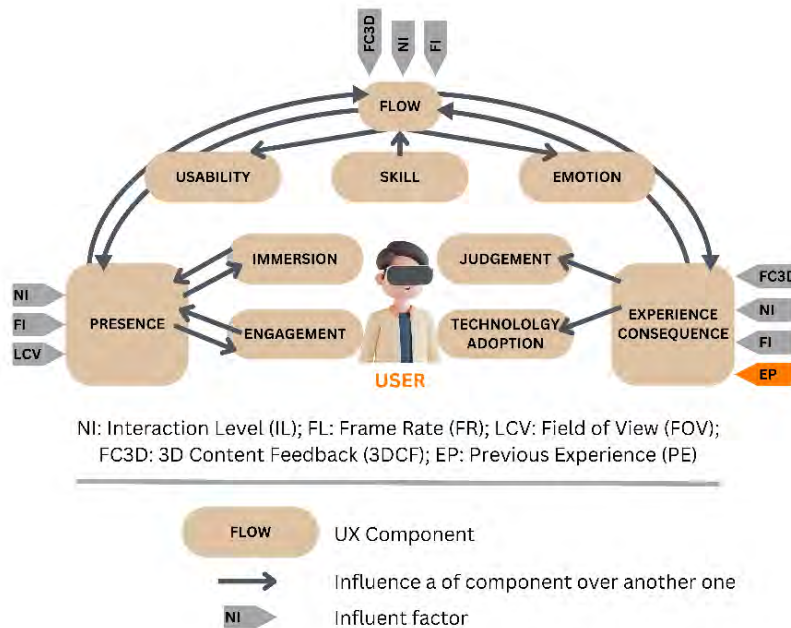
If the purpose of a workforce development program is to provide students with realistic experiences to prepare them for jobs in industry, then VR has the potential to benefit CTE. Wells and Miller (2020) found that SBAE teachers held favorable opinions toward VR but were uncertain regarding its use. Making these experiences as realistic as possible, VR can be used in wider training applications, including the various content areas of SBAE. However, a lack of literature exists exploring VR based learning experiences in CTE and SBAE. This study begins to address the gap of literature regarding the integration of VR into SBAE.

Theoretical Framework

The theoretical framework chosen for this study is the user experience (UX) model developed by Tcha-Tokey et al. (2016). The model was defined by a variety of different components depending on the field in which the VR experience lives (Tcha-Tokey et al. 2016). This framework helped us contextualize teachers’ experiences by guiding the interview questions to allow their lived experiences emerge through the lens of user experience. The components of this model are Presence, Immersion, Engagement, Flow, Usability, Skill, Emotion, Judgement, Technology Adoption, and Experience Consequence, as shown in Figure 1.

Figure 1

User Experience Framework



Presence, also used as a construct, is defined as the user’s sense of being there in the VE (Pallot et al., 2013). Engagement is defined as the energy in action, the connection between a person and its activity consisting of a behavioral, emotional and cognitive form. Immersion is the “illusion;” that is, the virtual environment technology replaces the user’s sensory stimuli by the virtual sensory stimuli (Witmer et al., 1998). Flow is a pleasant psychological state of sense of control, fun, and joy that the user feels when interacting with the VE (Heutte et al., 2010). Skill is defined as the knowledge the user gain in mastering his activity in the virtual environment

(Murphy et al., 1989). Emotion is defined as the feelings of joy, pleasure, satisfaction, frustration, disappointment, anxiety of the user in the VE (Pekrun et al., 2011). Usability is the ease of learning and the ease of using the VE (Brooke, 1996). Technology Adoption is the actions and decisions taken by the user for future use or intention to use the VE (Venkatesh et al., 2003). Judgment is the overall perceptions (clarity, originality, practicality, etc.) of the experience in the VE (Hassenzahl et al., 2003). Experience Consequence is a component defined as the symptoms or "simulator sickness", stress, dizziness, head ache the user can experience in the VE (Kennedy et al., 1993).

This model applies to this study by focusing on the overall experience of the user. The UX model combines the above constructs to describe the experience of users in virtual environments. Mikropoulos et al. (2020) created an AR system allowing parents, special educators, and therapists of children with autism and sensory overload to experience the same effects, which was found to be convincing, comfortable, and user-friendly through user experience. Usability, technology adoption, and symptoms are also the main component that should be considered when designing VR experiences (Alenazi and Demir, 2019).

Purpose and Research Objectives

The purpose of this qualitative study was to determine the feasibility of a VR curriculum to provide a useable and realistic experience for SBAE teachers. The central question guiding this study was: "Does virtual reality provide a realistic experience and supplemental option for skill-based education?" The study was further guided by two research questions:

1. What was the lived experiences of Ohio SBAE teachers' who implemented a virtual reality experience?
2. What was Ohio SBAE teachers' sense of realism in the virtual reality program?

Methods

The research questions were addressed by using a transcendental phenomenology design, which is meant to reduce the individual experiences with a phenomenon to a description of the universal essence (Creswell, 2007; Creswell & Poth, 2018; Yin, 2015). The phenomenon in this study is the essence of the VR experience in which the teachers are participating.

VR Experience

The virtual reality program utilized for this study was a curriculum resource developed with USDA-NIFA funding under the Youth Farm Safety and Education Program, titled Safety in Agriculture for Youth (SAY). This tractor safety simulation was designed at The Ohio State University using software services of Victory Enterprise, Inc. The software program operates on the Oculus Quest/Quest 2 VR headsets. The VR program was based on the operating skills and driving courses within the National Safe Tractor and Machinery Operation Program (NSTMOP). Throughout the development process, the experiences received reviews from a content advisor and three Extension representatives who have taught and certified students through the NSTMOP program. It was also pilot tested with 15 college of agriculture and related sciences students enrolled at The Ohio State University.

In the virtual environment, participants can move freely between three different areas. Upon entry, the area to their left has a barn and stationary model tractor. Users can interact with the tractor to review safety content related to their classroom curriculum. The skill testing area is

outside of the barn. This area was designed to represent the skills test portion of the Department of Labor (DOL) certification program. Here, the users interact with a stationary tractor's power take-off (PTO), hydraulic connections, and implement hitch. The final area is a virtual driving course. This course was modeled after the NSTMOP driving course and satisfies the DOL certification criteria. Users are required to answer questions that are intended to represent pre-operational checks they would conduct on a real tractor before they drive it. Next users must safely mount the tractor, fasten the seatbelt, start the tractor, engage the correct gear, and successfully drive the course. Points are accumulated if users brush, strike, or knock over an object or mount the tractor incorrectly.

For this study, an Oculus headset with instructions on how to use the headset, and steps for completing the program were delivered to research participants. Teachers were instructed on the use of the technology and provided a video link with the same information. Teachers were instructed to teach their machinery curriculum and allow students to use the virtual experience for two weeks.

Sample

A volunteer sample of SBAE teachers ($n = 11$) were recruited from Ohio to incorporate a VR safe tractor operation experience into their curriculum; these teachers were then purposively sampled for this study. Teachers who were sent a headset were provided with a notecard to sign up for a semi-structured interview upon completion of the experience. Interviews were scheduled once teachers consented to the interview. Polkinghorne (1989) recommends that researchers interview 5 to 25 individuals who have experienced the phenomenon.

Data Collection

Participants engaged in a one-on-one, semi-structured interview. Interviews were conducted via Zoom and were transcribed verbatim. To begin the interview, participants were asked to describe their prior perceptions of VR technology. This led into the discussion of how the experience was used by the participant. Participants were asked to rate and describe the realism of the experience. To end the conversation, they were asked about their after-study perceptions of VR, as well as any positives or negatives related to this experience. Interviews were conducted until results reached saturation.

Data Analysis

Moustakas (1994) recommended that a phenomenology follow the structured method of describing the personal statements, developing a list of significant statements, grouping the statements, creating a description of "what" participants experienced, drafting a description of "how" the experience happened, and write a composite description of the phenomenon. The qualitative data were analyzed for significant statements, sentences, or quotes that provide an understanding of the experience. Those items were highlighted and developed into initial codes, then into meaning units, and finally into themes. Those themes were then used to create the textural and structural description of the users' experience (Creswell & Poth, 2018; Moustakas, 1994). Reliability was ensured by obtaining detailed field notes and descriptive transcripts. The interview data were coded by one person. An external audit was conducted with a faculty member to examine the process and the product to assess accuracy (Creswell, 2007). As data were analyzed, a new question emerged that replaced a previous one guiding this objective. Instead of describing the teachers' user experience, emerging themes described teachers' experience of integrating virtual reality into their classrooms.

Findings

Through the first research question we sought to describe SBAE teachers' lived experience of implementing the VR experience through semi-structured interviews. From these interviews, two major themes emerged, with 9 sub-themes.

Theme 1: The experience provided valuable benefits

Teachers shared that VR helped them provide an experience the teacher could not provide, an experience that a student was unlikely to have, or even helped them alleviate nervousness or fear around machinery. Most of the teachers said they saw an increased level of engagement from students who do not usually engage with the class and that this promoted a higher level of social collaboration. The engagement depended on the previous experience students had with VR and machinery operation and could often be used to identify students that did not have any driving experience. Teachers mentioned that this was a positive, fun, and educational experience with minimal negative symptoms, common with VR. The proceeding sections break this theme into more descriptive sub-themes.

Sub-Theme 1: Using unique content engagement to provide unattainable experiences

Almost all teachers shared that this experience allowed them to provide students with an experience they would not normally get or allow them to practice an activity for which they do not have equipment. Teacher 4 said she usually just teaches the safety curriculum because her students come from a more urban area. She understands that they don't have that experience: "Because again a lot of my kids are not going to have that opportunity to get on a tractor or to have, they may be on a small lawn tractor." Teacher 5 was in a similar situation where she also did not have the equipment available to teach her students and understood this was a "kind of like a low stakes way to teach people, and I could see this being used in the training field outside of a classroom setting." Teacher 11 stated, "For, like, an urban agriculture class like mine that kind of virtual experience I think it's really, really cool because I cannot provide that to my students because I don't have that equipment, it's not in my community." While most teachers echoed these sentiments, Teacher 8 has a program that manages a large school farm. While he felt like the experience was good for giving experience it wasn't a good fit for him.

Sub-Theme 2: Promoting enhanced engagement through technology and social collaboration

Teachers saw enhanced engagement in their students while they participated in this experience. Teachers noted students who were previously more reserved became more engaged because this was a technology they knew and understood. It also allowed them to help both other students and teachers who didn't have experience with this technology. Teacher 4 said, "That was unintentional - was the teamwork of it so as one kid was struggling, and they were watching on a TV another one coming beside them and started to coach them." Related, Teacher 6 said, "it was kind of neat to watch the kids who typically are not like the straight-A really engaged kids, were the ones who were teaching the other students." Students were overall highly engaged through the activities in the experience.

Over half of the teachers stated that, depending on the students' previous real-world experience, their experience in the program was different than what was expected. Most teachers found that their students with no farm experience did better in the experience than students that had farm experience. Teacher 8 noticed his students "were more frustrated, like it was because the program itself just wasn't responding like they felt it should. It wasn't that they couldn't do it,

but they wanted to be able to do the physical motions.” Other teachers dealt with frustration and tried to coax students through the experience when they wanted to quit. Teacher 8 stated, “They would get really frustrated and they would just want to stop, and they won't even want to finish the course and I had to really do some coaxing.” Due to the students that had more real-world practice struggling with the VR experience, it allowed students who had VR experience or who picked up the driving easy the opportunity to help others.

Sub-Theme 3: A positive educational experience that has future implications

An emergent sub-theme from the teachers was that this experience was positive, provided sensible educational content, and has plenty of potential for future use. Teacher 4 described VR as so important that, “... the adoption of this is a non-negotiable in my mind. I just wish there were more experiences, that would open the door to more options for our kids.” Teacher 8 saw that while it was applicable for him at this moment, he could see the potential that an experience like this could provide for students: “I understand this at the beginning, so I think there's a lot of potential there.” Teachers were able to see the potential that VR has in the educational setting. Teacher 6 went as far as to say she wished “there was more valid experience like this one available” and that she “would love to incorporate more experiences like this one” into her classroom.”

Sub-Theme 4: Mostly no symptoms were experienced except minor motion sickness and dizziness

Almost all of the teachers reported that this experience did not produce any significant negative symptoms that common VR experiences might cause. Only a couple of teachers said they experienced motion sickness, but not experience this to the point they needed to quit using the headset: “I don't know if it was just the closeness and all that stuff that, I just wasn't used to the motion sickness yet.” Teacher 11 said he did not like the feeling of coming out of the headset and getting reoriented to the real world: “When I came back out of the virtual reality environment, especially in the longest session I did find that my eyes took a little bit of time to readjust to real-world lighting and real-world spatial dynamics.” For the most part, teachers described few instances where they experienced motion sickness while in the headset and little to no other symptoms.

Sub-Theme 5: The experience made a typically dry topic more interesting.

This sub-theme breaks down the positive contextual emotions experienced by the teachers and students, which focused on collaboration, excitement, and competitiveness. Multiple teachers described students becoming competitive with each other, trying to get the lower (better) score, which translated into them having fun with type of topic. Teacher 1 said, “...it made learning fun is what it did, and I know this is all about tractor safety, which is definitely not one of the most engaging topics, but I think it was good that it was done over a nonengaging topic. Teacher 2 saw that her students “had a lot of fun. I think a lot of the kids really enjoyed trying to at least, and even if it wasn't necessary to do the test, like the safety tests, they just wanted to drive the tractor.” Teachers described the students as “excited” that they got to try something new like VR in class and expressed gratification that it made an “not so interesting topic interesting again.”

Theme 2: New technology brought new challenges.

The second theme and four sub-themes emerged from the challenges that arose from trying to use new technology like a VR headset in the classroom. All of the teachers mentioned

they had little to no VR experience, and needed to practice with the headset on their own. Some of the teachers dealt with the challenge of trying to manage the classroom with only one headset and making sure all of the students stayed on task. All of the teachers described technological issues of some kind. Learning curves and access to technology emerged as the main issues that teachers faced while using the equipment.

Sub-Theme 1: Teachers have little experience with virtual reality requiring necessary practice and experimentation.

All teachers who used the VR technology for the first time encountered learning curves and technology barriers that inhibited them from learning how to use the technology. Teacher 4 stated, “I had to go back and watch the YouTube video that you provided so that I was sure that I walked through the process correctly, and again I think that's a generational thing probably.” Some teachers went as far as to have their students help them work through the technology. Teacher 2 stated that, “I have a couple (of students), ... that's what they do for games, that's all they have is VR, so they could kind of talk me through it.” While some teachers had technology or gaming experience, they did not have experience with VR. Teacher 2 also stated she was always interested in VR but never really “had the opportunity to use it” or determine if she wanted to get it. Teacher 11 described himself as “top of the game” when it came to technology: “People would come to me and be like how do I do this thing and I'd solve it” but VR always seemed to be “way beyond” what he usually does.

Sub-Theme 2: Virtual reality requires thoughtful classroom and resource management.

Teachers identified time as one of the biggest factors toward making the most of implementing the experience in their classrooms. It was often stated that it took too much time for the students to get through the experience. Teacher 1 said, “the biggest challenges I had was getting the kids involved with it and doing so in like a timely manner because I didn't do this with every class.” Teacher 3 wished he had more headsets to allow students to use them simultaneously. Related, Teacher 5 said his biggest challenge was teaching his whole class with just one piece of equipment.

Sub-Theme 3: Access to technology affected experience and learning.

Teachers identified barriers that prohibited them from using this technology correctly such as the experience feeling more like a game than a learning tool and not having the ability to cast what was on the headset to their computers. Teacher 5 felt his students “saw it more as a fun activity versus a learning activity.” Teacher 8 who has previously used a virtual welding simulator discussed how the welding simulator presented closer to the actual task, whereas this VR felt more like a video game. Other teachers focused on technological issues such as casting or Wi-Fi issues. Teacher 11 said, “we had a variety of issues with casting from either getting the headset connected to the school's Wi-Fi or the Wi-Fi not being strong enough to be able to support the casting or just having the content blocks.”

Sub-Theme 4: The experience brought out the users' negative contextual emotions.

This fourth sub-theme breaks down the negative emotions experienced by the teachers. The negative emotions focused on apprehension, being overwhelmed, and feeling frustrated. The biggest negative emotion experienced was related to frustration. Teacher 3 experienced frustration around not being able complete certain actions in the experience, which led to students restarting the experience. Teacher 5 and his students got frustrated when they could not figure out what to do next or which buttons to click: “I think lots of them are getting frustrated

and they're like I don't I don't know where I'm going or I don't know what I'm clicking, and which button do I click." Teacher 2 stated she felt some nervousness around teaching with new technology about tasks many students have little to no experience with. This frustration and nervousness experienced by the teachers and the students prevented them from using the technology in a beneficial way. Such that, teacher 5 and 6 were skeptical about using VR equipment again.

Theme 3: The experience provided a semi-realistic interpretation of a hands-on activity.

The second research question sought to describe SBAE teachers' sense of realism in the virtual reality program through semi-structured interviews. From these interviews, one theme emerged from their responses. This theme emerged from how realistic the teachers thought the VR experience was. Although the teachers described this as semi-realistic, there were some aspects that limited the realistic nature of the experience. The limitation of VR prevented them from performing the instinctive movements they were used to doing.

Sub-Theme 1: The program did not allow for instinctive action due to the limitation of VR.

While the experience did provide some realistic features for the teachers to experience, some instinctive actions weren't as realistic as they could be. Teacher 1 stated "The prechecks weren't as realistic because it's like if you were doing a precheck you'd actually have to go and like look at the thing, instead of here where you just checking a box." Teacher 9 described it as imperfect as of yet: "It's not quite like how it is in real life, but it does give them a feel for it. It's not perfect, not yet at least." Teacher 6 felt that "getting on the tractor and moving some of the controls weren't as realistic, but I'm not sure that they could be more realistic either." Comments like these demonstrate that in creating educational experiences like the one in this study, completeness of the experience is important. Realistic experiences can provide more relatable content for participants and in turn, can build knowledge off of this experience.

Sub-Theme 2: The presence and sense of space was realistic.

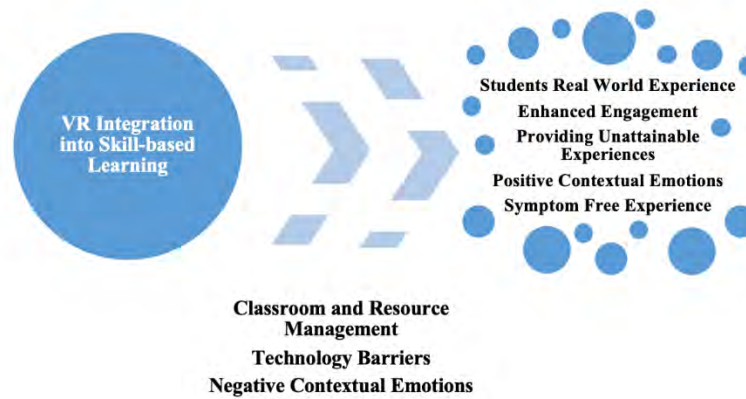
The second sub-theme emerged from teachers speaking about how realistic, present and immersed they felt within the experience. There were certain components that teachers felt were realistic, such as the driving course. Teacher 4 said "how to touch the key and turn that on, how to unbuckle or buckle the seat belt, and how to step up onto the tractor. So, from an immersive experience I like that, things looked real." Although Teacher 5 did not have a positive experience with the program, he still felt that it had some realistic components, especially where all the parts were located. Even though there were critiques associated with the completeness of the experience, teachers were still impressed with the level of realism that the experience was able to provide. They felt that it helped students make connections between the real thing and the VR tractor.

Conclusions, Implications, and Recommendations

To address the research questions, agriculture teachers participated in semi-structured interviews to allow for their lived experiences to emerge. Three themes and 11 sub-themes emerged from those interviews, concluding overall that teachers had a valuable and positive experience. To describe the essence of these results, it's important to look at these results as two separate groups: benefits of VR integration and barriers facing VR integration. Figure 3 displays how the barriers can potentially prevent students and teachers from seeing the benefits of integrating VR into skill-based learning.

Figure 3

Barriers of VR Integration Influence on Benefits



This figure graphically articulates the three main barriers that impede VR adoption as perceived by teachers. These were identified as classroom and resource management, technology barriers, and negative emotions. When these are present, it may be challenging for students and teachers to see the benefits of integrating VR into their skill-based activities. Even though these barriers are present, that does not mean that some of the benefits of VR adoption cannot still be experienced. Teachers mentioned in their interviews that while they still felt frustrated at the casting technology, they were still able to provide students with a unique experience that they would have not been given otherwise. Teachers were provided with one VR headset to use in their classrooms. Because of this, some wished they had additional headsets and teachers took longer to train their students because of having only one headset. Overall, from the emerging themes, it can be concluded that this experience was positive and able to provide an engaging and unique experience; but more importantly themes described the valuable benefits that VR can provide as well as the barriers that are impeding VR's integration. Additionally, it was concluded that teachers had a semi-realistic experience. Teachers went as far as to try to grab the steering wheel and other levers as if they were real. In addition, their bodies would move with the tractor as they drove and would respond to the movements and motions as if they were actually driving a tractor. However, teachers also reported that not being able to do more instinctive actions like checking the oil or grabbing the steering wheel took away from the realism of the experience.

Wells and Miller (2020) found fairly agreeable opinions among Iowa teachers related to the integration of VR in SBAE programs, which align with some of the positive perception's teachers identified in the interviews for this study. They also found that the teachers were unsure that the benefits of VR would outweigh the potential costs. This supports the findings from the teachers' interviews regarding this experience providing valuable experiences for students. Their study also echoed some of the concern's teachers voiced regarding its use in the classroom as an educational tool. Although these barriers may seem trivial, it is in fact crucial for the successful implementation of VR in the classroom. This implies that until we attempt to alleviate the challenges and remove the barriers in place, teachers will only have semi-successful experiences with VR in their classrooms.

Lamb and Etopio (2019) found that a VR versus real-life condition where preservice teachers had the opportunity to confirm, extend, or disconfirm their prior knowledge about how

they will react in the classroom resulting in the construction of new knowledge, skills, and strategies was not significant. Their study did find that it can promote learning from modeled real-life situations for the transfer of theory into practice. Lombard and Ditton (1997) argued that when a user is not familiar with something, like virtual reality, that unfamiliarity promotes a lower presence score and in turn can't be a realistic experience. Gisbergen et al. (2019) found that even though differences in realism were observed they did not have an effect on experience or behavior. They found that there might be other variables that can affect the whole experience to essentially "obliterate" the effects of a better sense of presence and realism (Gisbergen et al., 2019). Gisbergen implies realism is important to the users' experience as well as making a successful integration of VR into a classroom or curriculum and can allow them to see the potential uses that VR can provide. Also, other factors of the experience can negatively affect the users' experience and detract from the realistic nature. By ensuring that educational experiences are as realistic as possible, it will make the experience more transferable to real-life situation so students can make those connections.

Because this study was limited in the number of classrooms, teachers, and students that were able to use and complete the VR experience, the results are not representative of the SBAE teacher and student populations. Further research needs to be conducted in a more structured setting to see the true effect that VR can bring to the classroom. There is a small body of knowledge regarding the integration of VR into SBAE, currently focused on VR welding experience, the recommendations presented here will add to this body of knowledge.

Further research should be conducted to assess teachers' opinions of using VR in the classroom and if they feel it is a novelty or a useful tool. From our findings, teachers described some of their students as having VR experience, so more research should also be done with them to see how they view VR technology. Further research needs to be conducted to develop an implementation program for teachers implementing a VR experience like this into their curriculum. The issues that arose could be alleviated by providing teachers with a structured implementation guide.

More qualitative work should be conducted to explain teachers' perceptions of VR and how they view it as an educational tool. Work could also be done with administrations about their view of VR and what potential it could have for students as an educational tool. More work should be done with teachers to determine if the emerged themes are present amongst other teachers across the state or other states. Research should also be done to determine what other barriers may exist that hinder the implementation of VR in educational settings. Work should also be done about teachers' perceived barriers to implementing VR technology into the classroom with a focus on teachers who have utilized the technology and teachers who have only seen it being used.

Realism is a concept that is not directly measured by the constructs of the user experience model, but the constructs of Presence and Immersion do relate to realism (Lamb & Etopio, 2019). Other qualitative work can be done to discover barriers that cause an experience to be unrealistic. Quantitative work can also be done to discover potential relationships between the constructs of the user experience model and realism. More research should also be conducted to determine if there is a relationship between participants' user experiences and their perceived realism of the experience. Several constructs such as presence and immersion, have been shown to influence the realistic nature of a VR experience (Goncalves et al., 2022). So, more research

should be conducted to determine if any of the constructs of user experience have a relationship or effect on the realism of an experience.

This study provides a starting point for individuals who are interested in integrating virtual reality experiences into a classroom setting. It is recommended that state staff, administration, and teachers address potential issues before integrating the technology. Addressing these issues beforehand can relieve a lot of frustration in the future. State staff should try to provide continuing education opportunities for pre- and in-service teachers to interact with new technologies, such as VR.

Regarding this specific VR experience, more work should be done to optimize navigation throughout the experience. Users explained there were times they did not know what to click or where to go, by providing an anchored menu providing instruction could alleviate some of the frustration experienced. The level of immersion should also be expanded to allow user to complete more tactile actions, such as checking the oil, or grabbing the seatbelt. This will increase the level of engagement and allow users to complete those more instinctive actions they would do on a real machine.

Other opportunities at professional development conferences should be developed to allow teachers to see what is available and interact with the technologies if possible. State agencies should consider providing opportunities or incentives for districts to adopt VR technologies through funding opportunities such as grants or incentives. Teacher educators should provide an opportunity for pre-service teachers to experience using VR technology in an educational setting. Pre-service teachers should also be made aware of funding opportunities to supply their classrooms with VR technology. The opportunity to work with new technology can open up collaboration opportunities with other departments across campus to provide pre-service teachers access to new instructional technology.

Some teachers described in their interviews that their administration wanted to stay at the forefront of technology by having the newest equipment available, but most of the teachers disagreed that they had the financial support to purchase this technology. Administrations should be made aware of the available technology, and the value it provides for the teachers. Administrators should make themselves available to see teachers try out new technology in their classrooms. Some teachers said their principals came by the class while they were using the headsets and even tried it out themselves.

This specific VR experience is a part of a supplemental piece of curricula, patterned from the National Safe Tractor and Machinery Operation Program and could be used with similar tractor and machinery certification programs. Teachers can use it with their curriculum but need to be aware of the content in the experience to ensure transferability between their curriculum and the experience. Therefore, teachers should make it a priority to integrate a potential VR experience into their curriculum and not use it as a side activity in the classroom. This will allow students to see it as the educational component it was designed as, and not as a game. Teachers should make sure they have properly reviewed the instructions and practiced the experience before introducing it to the students. Teachers should make sure they have used technology enough to feel comfortable using it in front of their students and to talk them through the basic steps.

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Learning Leadership in a Post-Pandemic Environment: Brokers, Connection, and New Leadership Trajectories

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The COVID-19 pandemic and subsequent responses had catastrophic effects on students of all ages academically, mentally, and emotionally. As leadership educators in a college of agricultural science, we felt compelled to respond to adjust our programming and pedagogy for a post-pandemic era. The purpose of this study was to explore the experiences of first-year college of agricultural science students who engaged in an intentional community of practice about leadership. We used a phenomenological case study approach and a social learning theory to specifically investigate the ways in which a social learning environment and the use of brokers contributed to student leadership trajectories. We found student leadership identities shifted as a result of engaging in a caring community with the aid of candid and connected brokers. A small class size, multiple connections with an industry mentor, and a course centered on student voice resulted in new confidence and plans to pursue future leadership opportunities.

Introduction and Literature Review

We didn't ask for it; it just happened. The critical thing now is what we are going to do about it. In early 2020, the world of higher education changed dramatically with the introduction of COVID-19 and the subsequent global pandemic. Now, institutions of higher education are educating the first waves of students who experienced major learning disruptions in high school. The effects of the pandemic, including quarantine and isolation requirements, have promoted social isolation, loneliness, and a lack of motivation in college students (Birmingham et al., 2021, Center for Collegiate Mental Health, 2021). Birmingham et al. (2021) reported students as "being stressed, depressed and lonely, with restless sleep patterns, and an inability to cope with the situation, yet most of their social network was unavailable to help them cope" (p. 12). A Harvard University study reported 43% of young adults felt an increase in loneliness since the beginning of the pandemic and over 61% felt "serious loneliness" (Weissbourd et al., 2020). Furthermore, "about half of the lonely young adults in our survey reported that no one in the past few weeks had 'taken more than just a few minutes' to ask how they are doing in a way that made them feel like the person 'genuinely cared' " (Weissbourd et al., 2022, para. 5). Furthermore, research also shows that our post-pandemic students struggle with increased rates of anxiety, depression, and suicide (Richtel & Flanagan, 2022).

Further compounding the problem, not all students were equally impacted by COVID-19 and subsequent responses. According to the 2021 National Survey of Student Engagement (NSSE), disproportionately high levels of anxiety were seen in women as compared to men. Regarding first-year students, 56% of women reported increased anxiety as compared to 36% of men (NSSE, 2021). Research by Fruehwirth et al. (2021) found moderate to severe anxiety rates increased from 18.1% pre-pandemic to 25.3% mid-pandemic among first-year college students.

The rates of depression symptoms increased likewise from 21.5% to 31.7%, with significant increases among black, female, and sexual or gender minority students (Fruehwirth et al., 2021).

The discrepancy of the pandemic impact has also highlighted pre-pandemic inequities in learning. Even prior to the pandemic, some of the pre-existing inequities make it more likely for minoritized groups of students to suffer disproportionate impacts in dropout and time to graduation (Velez et al., 2019). Early data from the National Student Clearinghouse Research Center (2020) shows a drop in enrollment for Black and Hispanic students compared to early pre-pandemic enrollments. The differential impacts are further highlighted by a study from the University of California (LA) Latino Policy and Politics Initiative, which found almost 45% of Latino and Black students canceled their academic plans, post-pandemic, as compared to 38% of White students (Ahn & Dominguez-Villegas, 2022). The pandemic appears to have widened the achievement gap.

When we explored the impacts of COVID-19 and COVID-19 restrictions, it appears discouraging and can feel overwhelming. However, as faculty at academic institutions, we are tasked with modifying our content and courses in a way that ensures relevance and continues to meet student needs. We have the potential to create new courses and programs, or reinvigorate existing programs, to help provide a sense of social connectedness, belonging, and relationship to our students. The role of relationships is critical and Birmingham et al. (2021) highlighted the strong evidence supporting the role of social support and social networks in coping with stress, decreasing negative mental health, and adjusting to future stress. The Center for Collegiate Health (2021) further analyzed the challenges and impacts of COVID-19 and called specifically for interventions by colleges and universities that are targeted to improve mental health, encourage student ability to motivate/focus, foster social connections, alleviate academic distress, and help students overcome missed experiences and opportunities.

We know there are ways for colleges and universities to make a difference, perhaps leadership education can be the conduit for change and a place where we can address the challenges created by the pandemic. Involvement in leadership development activities has been shown to help students “develop resilience, become more adaptable, and prepare them for a world in which they will be expected to be agile and innovative” (Deal & Yarborough, 2020, p. 4). Leadership development programs can help students be more engaged in their education, create a stronger sense of belonging (Deal & Yarborough, 2020), and gain skills in communication, self-esteem, problem-solving, and conflict resolution (Zimmerman-Oster & Burkhardt, 1999). Further research identifies leadership development opportunities as improving decision-making, time management, critical thinking, and student sense of purpose while cultivating life skills and a more positive college experience (Dugan, 2011; Kuh et al., 1991; Smith & Chenoweth, 2015).

Extant research highlights the ways in which leadership education can offer a critical context from which postsecondary students can improve their leadership skills (Dugan & Komives, 2007; Posner, 2009; Rosch & Stephens, 2017). We also know that post-pandemic students have changed and have unique needs (Richtel & Flanagan, 2022). Given this, it is imperative leadership education faculty think creatively about how to develop programs that meet rigorous learning outcomes and goals while meeting the needs of post-pandemic students. With this in mind, we developed a unique leadership learning experience to support mental health, connect students with each other, foster growth in an academically low-stakes environment, introduce students to college-wide opportunities and connect students with industry mentors.

Background

In an effort to foster engagement in leadership education within the College of Agricultural Sciences at Oregon State University and build a community of belonging, we developed a low-stakes, foundational, two-credit course titled Leadership Launch designed specifically for freshman and transfer students. This course was developed with the goal to introduce students to leadership concepts, create a pipeline for continued leadership education, connect them with our college, introduce them to industry professionals, encourage belonging, and enhance the retention and support of diverse learners. To address our goals, we developed what we hoped to be a unique community-supportive structure with small class sizes and significant and continual faculty-to-student and industry mentor-student interactions. We utilized the Kouzes and Posner Student Leadership Challenge (2018) and companion student workbook as course texts. This provided an introductory, application-based, and relevant connection for students as they began exploring leadership. We adopted pedagogy that encouraged interaction and connection by incorporating icebreakers, personal check-ins, name tents, reflective questions, small- and whole-group discussions, and refreshments. We also encouraged movement by engaging in walking discussions and using a variety of seating options. Course assignments were reflective in nature, application-based, and intended to support a relationship-oriented and inclusive community.

Theoretical Framework

Given the situatedness of leadership education in a post-pandemic era, we thought it would be advantageous to adopt a social learning theory, specifically Wenger's (1998) *Community of Practice* and Wenger-Trayner et al.'s (2015) *Landscape of Practice* as a lens through which to explore student learning and experiences in Leadership Launch. Wenger (1988) postulated that learning is a social endeavor through which individuals construct their identities, seek belonging, and negotiate meaning as they actively participate in the practices of various communities of practices. *Communities of practice* are groups of individuals who congregate via mutual engagement and shared repertoire (Wenger, 1988). Participation and reification within a given community yield a social history of learning. This history develops a *regime of competence*, or a particular set of criteria defining legitimacy and competency within a given community (Wenger-Trayner et al., 2015). Our identity development, our identity *trajectory*, is thus shaped within and across communities. It is ongoing, temporal, and constructed within social contexts (Wenger, 1998).

The difficult work of learning, developing identity, and navigating regimes of competence associated with multiple communities of practice can be aided by the help of *brokers*. Brokers are able to make connections across multiple communities of practices, enable coordination of practices, and facilitate "new possibilities for meaning" (Wenger, 1998, p. 109). Wenger (1998) states, "Brokering is a complex job. It involves the process of translation, coordination, and alignment between perspectives" (p. 109). Brokering is more than just making connections; brokering requires trust and legitimacy, it involves emotional management and supporting the learning experience as well as mobilizing resources from various communities (Wenger-Trayner, et al., 2015). We operationalized Wenger (1998) and Wenger-Trayner et al.'s (2015) theoretical concepts to think about how students in the Leadership Launch course learn, position themselves as leaders, and make plans to enact leadership behaviors in the future. We

position the Leadership Launch course itself as a community of practice and the professors, industry mentors, and guest panelists as brokers who facilitated and guided student learning, articulating regimes of competence associated with college, career, and leadership.

The purpose of this study, therefore, was to explore the experiences of students who took Leadership Launch in 2022 at Oregon State University paying particular attention to the ways in which a social learning environment and brokers contributed to student learning and meaning-making. The questions that guided our inquiry were, 1) *How does social learning influence student leadership trajectories?* and 2) *How can brokers guide students in their leadership learning?*

Methods

The aim of this study was to understand student experiences and perspectives, positioning the students as the central investigation and focus when exploring all data sources. Therefore, our methodology embodies a phenomenological case study. The case study method, accompanied by the phenomenological approach, allows us to make sense of a particular lived experience bound by the time and place of a specific case (Yin, 1984). Phenomenologists explore the lived experiences and perceived realities of a certain group of people (Moustakas, 1994). This approach permits researchers to collect and understand first-hand knowledge of the phenomenon under examination. Case studies are “an empirical inquir[ies] that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” (Yin, 1984, p. 23). This study's qualitative data collection methods provided us with empirical evidence to support our claims and answer the research questions.

Situating Ourselves

It is important to recognize and acknowledge the influence that our professional identities had on this research. Two of us served as lead instructors for each course and the third member was the teaching assistant for both courses. One member of our research team is an Assistant Professor in Leadership Education. She oversees Oregon State University's (OSU) Leadership Minor and teaches graduate and undergraduate leadership courses. She also serves as the co-director of the College of Agricultural Sciences Leadership Academy. The second member of our team is a Ph.D. student who is on a teaching assistantship through the department of Agricultural Education and Agricultural Sciences at OSU. Her teaching assignment includes teaching and/or co-teaching leadership courses. The third member is a Professor of Leadership and department chair of the department of Agricultural Education and Agricultural Sciences. He teaches both graduate and undergraduate leadership courses and co-directs the College of Agricultural Sciences Leadership Academy.

Case Description and Participants

Two replicates of the course were offered in 2022, the first during the spring term and the second during the fall term. Throughout the 10-week term, students participated in five, two-hour workshops centered around the five practices and ten commitments from The Student Leadership Challenge (Kouzes & Posner, 2018). One day was devoted to a student opportunities fair, where

representatives from various offices on campus shared about their organizations and how students could get involved. Additionally, groups of 3-4 students were assigned to an industry mentor. Industry mentors visited the course via Zoom for three, 50-minute sessions throughout the term. Each mentor connection was fairly unstructured; we encouraged students to learn about their mentor, ask questions in regard to their leadership journey, and solicit advice on how to navigate their college and career transitions and opportunities. Finally, we hosted two panel discussions each term, one of which was a group of leaders across the College of Agricultural Sciences and the other of which were leaders across the OSU campus. During each panel, students were encouraged to ask panelists about their leadership experiences, specifically in regard to the five practices of exemplary leadership (model the way, inspire a shared vision, enable others to act, challenge the process, encourage the heart) (Kouzes & Posner, 2018).

The total enrollment number from both pilot courses was 30 students, with 15 students in each class. Together, the students predominantly identified as White (66.7%), followed by Hispanic or Latino (20.0%), African- American (3.3%), Middle Eastern (3.3%), Pacific Islander (3.3%), and Native/ Indigenous (3.3%). Of the total sample, participants' year in school consisted of mostly freshmen (56.7%), followed by seniors (16.7%), sophomores (13.3%), and juniors (13.3%). Participants identified as mostly female (76.7%), followed by male (16.7%) and Non- Binary (6.7%).

Data Collection

After receiving IRB approval and informed consent from participants, we commenced collecting data from multiple and varied sources. Data sources for this study included pre- and post-course surveys, reflective journal entries, a culminating student project, and focus group interviews. The surveys assessed demographics, student satisfaction with the course, and key learning moments. Examples of open-ended questions on the post-course survey included, *What specific leadership behaviors are you able to utilize now that you have taken this course?* and, *What part(s) of the course content were more important in supporting your learning and why?* Three journal entries provided by each student throughout the term served as a reflection tool for students to describe their learning and processing throughout the duration of the course. The journal entries also provided data on student perception of leadership and utilization of course content. Students were asked questions like, *How are things going in the class for you?*, *How is the mentor experience going?*, *What are two-three big "ah-has" from the course thus far?* and, *Is there anything we can do to support you in the class?*

The leadership launch plan served as the final project and asked students to consider how they will apply what they learned in the course. Finally, focus group interviews were administered with the intent to gain an understanding of their engagement in the course, their experiences with mentors and panelists, and if their learning and leadership trajectories had shifted throughout the term. Specifically, students were asked if their perceptions of leadership changed because of this course, how they felt during the course, and how they envision themselves applying the course content to their lives now and in the future.

Data Analysis

We began with initial analysis and coding where we individually read each data source through analytic eyes, paying particular attention to the focus group transcripts, which were transcribed verbatim by Otterai services. This involved line-by-line reading, identifying patterns, making comparisons, and staying open to new discoveries and understandings (Emerson, et al., 2011). During this process, we asked ourselves questions about specific pieces of data such as, *what do I see going on here? how are students describing their experiences? and, how do participants talk about the mentors and panelists?* (Emerson et al., 2011). Initial codes allowed us to see the data in discrete parts and examine its nuances (Saldana, 2009). This was followed with a round of memos where the lead researcher captured her analytic thoughts, and insights, and began making sense of the data in light of the theoretical framework. Second cycle coding included iterative rounds of focused coding, where we used the initial codes to determine salient categories and emergent themes (Saldana, 2009).

Building Quality into the Study

According to Yin (2015), *trustworthiness* stems from triangulating the data and maintaining a chain of evidence. Yin (2015) suggested that having multiple sources of data helps to capture a broader range of perspectives, behaviors, and attitudes. We accomplished this by collecting multiple sources of data throughout the term and using this to inform our findings. To ensure *transferability*, we used thick descriptions in our findings by grounding our claims with illustrative quotes, thus enhancing the reader's ability to determine if the findings may be transferred to a different research context (Geertz, 2008; Stake, 2010). It is important to note that the research members hold positions of power in this study as they assigned student grades, hold advanced degrees, and have more life experiences, which may have influenced the results. In recognition of the power dynamics, the teaching assistant conducted the focus group interviews after the conclusion of the course, as several focus group questions asked for evaluations of the instructors. Additionally, we remained transparent about the research study with the participants throughout the entire process and ensured students that their responses would remain confidential. To build in *credibility* and *dependability*, we engaged in collaborative analysis and peer review with co-authors (Creswell, 2013; van Manen, 1990).

Findings

Our data analysis resulted in three overarching themes, 1) *A Caring Community* 2) *Candid Connectors* and 3) *Confident, Committed, Called*. We offer explanations of each theme and multiple illustrative quotes to give voice to participants and credibility to our claims. Following each quote is a code indicating the participant number and data source. Codes "post", "JE", "LLP" and "FG" are abbreviations for "post-course survey", "journal entry", "Leadership Launch Plan" and, "focus group", respectively.

Theme: A Caring Community

Students found the learning environment to be welcoming and inclusive. Students consistently described the class as safe, welcoming, connected, joyful, relationship-oriented, and inclusive. This commenced as students were asked about their engagement in the course in the three reflective journals as well as in the post-course survey and focus group interviews. Students responded with phrases like, "I feel very safe and welcomed within our class atmosphere" (JE-

Participant 7), “I feel really supported in this class. Everyone is genuine and we have a great atmosphere in the classroom” (JE- Participant 19), “I definitely feel welcomed in the classroom and seen by everyone” (JE- Participant 3) and, “Everyone gets along great, and I have been making more friends because of this class” (JE- Participant 5).

Students were eager to engage and comfortable participating in the learning process. These ideas were often connected to the emotions they felt during the class. Participants used words such as confident, ease, inspired, and excited when reflecting on their course engagement. One student commented, “excited because the content was engaging and I really wanted to learn how to better myself as a leader. I felt confident because I became more comfortable being a leader, speaking my mind and giving my opinions” (Post-Participant 22). Another student shared, “I felt challenged yet supported in the task of personal development. The course inspired critical thinking without making anyone feel criticized. If I had to select one emotion: inspired” (Post- Participant 12). Many students specifically connected their participation to the environment of the class. For example, one student wrote, “I feel fully confident in my ability to attend class and participate freely because the environment is very welcoming to sharing and others in the class are very good at listening and being respectful” (JE- Participant 22). Another commented, “It is very easy for me to participate and share because the environment is always welcoming. I am excited to take all the knowledge that I’ve gained and use it in my future” (JE- Participant 2). Other students like Participant 3 spoke of the multiple opportunities to participate and how this influenced their learning, “This class gives me a lot more chances to participate, reflect, and work on the specific aspects of what I want to gain from leadership skills” (JE- Participant 3).

Unlike other classes, students felt comfortable speaking to the class and supported when sharing their thoughts and stories aloud. Many students mentioned how this was a novel experience for them. Two students commented, “I feel extremely welcomed in the class and it is the safest environment out of all of my classes” (JE- Participant 22) and “I have no worries about sharing and discussing my experiences with the class and participating in group discussions, no one has made me feel excluded” (JE- Participant 1). Other students wrote, “I’m able to be humorous whereas in other classes I rarely speak out” (JE- Participant 5), “I felt very included and valued in this class, whenever I had something to share I believed that what I said mattered and I was never afraid to say what I was thinking” (Post- Participant 25) and, “I am definitely talking more than I did before and opening up in class and it does feel relieving (JE- Participant 8). An environment absent of fear, nervousness, or judgment prompted free participation. Two students captured this with the following reflections, “This is one of the first classes that I felt comfortable enough to actually get involved with class discussions instead of just sitting there” (JE- Participant 14) and, “I don’t worry about judgment or feel the need to essentially hide my thoughts from others.” (JE- Participant 7).

The freedom to participate without fear or judgment was strengthened by the mutual respect given by peers in the course. It became evident that peer interaction was important in the cultivation of a welcoming and inclusive environment. Students enjoyed learning from their peers and found the class to be an environment where students not only cared about each other but pushed each other to learn and grow in their leadership. This emerged as students shared comments such as, “I felt like people cared about my learning as well as their own which is very

encouraging in a classroom setting” (Post- Participant 11) and “Everyone is really nice and I feel that we really build when the groups are able to speak collectively” (JE- Participant 8). Perhaps the most powerful quote came from Participant 29 who commented, “I am strengthening my relationships with my classmates and feel very listened to—this is a pretty incredible group of authentic, present willing-to-learn humans that challenge me to share and participate at my fullest potential” (JE- Participant 29).

Participants also attributed the inclusive environment to the small class size and the intentional care of the instructors. The “small class vibe” enabled “one-on-one conversation with other people” (JE- Participant 3), “time to get to know everyone, which in turn makes everyone feel welcome” (JE- Participant 7), and a space where “opinions are wanted and that my well-being is cared for” (JE- Participant 6). Students noted the ways the instructors facilitated the opportunities for sharing with comments like, “You give great opportunities to share what we are thinking and allow us to participate a great deal during the class and I really appreciate that” (JE- Participant 13) and “I think that the instructors and other students do a good job of making sure that everyone’s voice is heard and if we want to say something that we can say it” (JE- Participant 3). Participants also felt cared for and valued by the instructors. One student captured this by stating, “It really feels like everyone is taken care of in the best possible way” (JE- Participant 19). Perhaps the most surprising comment came from Participant 7 who shared,

This is the only class that I have had so far since starting college where all the teachers in this class actually took the time to know my name and me, by actively asking about my week and it is very comforting to know that they are there for me.

Further, students noted the connection between instructor care and learning, “I feel as though all of you professors are doing a phenomenal job making sure everyone feels included, especially in discussions, and are very understanding, and are genuinely pushing us to be the best leaders we can be” (JE- Participant 7). Another wrote, “I felt accepted by the class and at ease around them. Dr. T did a good job facilitating this environment with group activities that pushed us out of our comfort zone and closer to each other” (Post- Participant 27).

Theme 2: Candid Connectors

The mentors and guest panelists played an important role in brokering student learning throughout the course. Having “real human beings share their personal experiences” (Post- Participant 2) and “having a human connection with what we’re learning” (Post- Participant 27) in real-time allowed students to imagine themselves as leaders, gain advice and form new perspectives while connecting with campus and industry professionals.

Participants appreciated the ways in which the mentors and panelists brought the content to life. This unfolded as students discussed the importance of communicating hypothetical concepts through stories of their lived experiences. Students were quick to attribute this technique to their learning with comments like, “I feel like the experiences and the stuff that they went through helped us connect to them in regards to where we are now” (FG- Participant 8) and “The mentor meetings were a great way to hear about and learn what leadership practices look like in real life, and in a job setting” (Post- Participant 6). Other students commented, “listening to real-life leaders...has really helped me develop and apply it more to my leadership” (FG-

Participant 2) and, “I think that [applying the content] gives you an idea of how you would use these principles in the real world, and puts them into the frame of mind for utilization (FG- Participant 15).

Not only did mentors and panelists bring the content to life, but their willingness to take time out of their day to interact with students was also appreciated and helpful. Students were grateful and found value in hearing from diverse perspectives. One student commented, “those personal connections with them... how they took the time to share that stuff with us and really help us” (FG- Participant 2). Another shared, “I was finding more and more similarities with how she handled things that I could also take from that. It was actually really cool to see a different perspective even though we're from completely different backgrounds” (FG- Participant 14).

The approach through which perspectives were gained and content was brought to life was amplified through candid conversations, vulnerability, and stories that illuminated moments of challenge and failure. For example, one student reflected, “I feel like having that whole panel say that failing is okay...that was like the biggest lesson that I learned. The panelists described this as failing forward” (FG- Participant 18). Another student wrote, “It was helpful to see real people and their real-life experiences, and knowing that they have truly failed and seeing where they are today is truly inspiring” (JE- Participant 2). When students spoke about the learning moments from the mentors and panelists, they consistently commended them for their honesty, candor, vulnerability, and “being real with us” (FG- Participant 23). One student wrote, “They were also so vulnerable which was very inspiring to see people in such high-up positions be so personal. (JE- Participant 23). Others shared, “I really appreciated my mentor’s honesty. She didn't just like tell us all the good stuff about her job but she also told us about stuff that is harder...instead of just sugarcoating everything (FG- Participant 23) and “I really liked learning how a lot of the guest speakers told intimate stories and trusted us while talking about it. A common ground these speakers had were their failures” (JE- Participant 7). A few students explicitly shared how this approach benefited their learning and conceptualizations of leadership. One student wrote, “I am taking with me how encouraged and inspired I was by guest speakers because I realized that hard work comes a long way and that we are all humans learning so, therefore, mistakes are what help us grow” (Post- Participant 1).

Theme 3: Confident, Committed, Called

Student conceptualizations of leadership significantly shifted throughout the ten-week term. What began as an association of leadership with power, position, and authority shifted to one centered on caring for people and working together to achieve a common goal. Leadership is not for a select few; leadership is for everyone. Students were easily able to articulate this shift in perspective as they reflected on their time in the course and captured this with phrases such as, “it certainly has shifted to really understanding that leadership isn't so much about the position that you're in and like the position of power one holds, but it is more about one's roles in a team” (FG- Participant 10), “Now it's much more about how can I build the relationships with these people so that they feel inspired” (FG- Participant 6) and, “I'd say my current understanding of leadership is that it is something that anyone can do. It is about having a vision and being able to share it with others and getting people together to solve a problem” (FG- Participant 27).

These paradigm shifts extended to the opportunities for leadership to be multifaceted and situational. Participant 8 shared, “after taking the course, I saw that you can be a leader in almost every aspect of your life. It can be the simple things, like planning a dinner with your friends or organizing an event and stuff like that” (FG- Participant 8). Another shared, “I found it as something anyone can do, no matter what position they're in, it's more of how they handle a situation than actually being in that position of power” (FG- Participant 14) and “I truly believe now that everyone and anyone on any team in any situation can, like everyone can be a leader at the same time. No matter what role you have, on any team, you need to be able to inspire, and motivate others” (FG- Participant 10). Further, students learned that “there is a process to becoming a better leader” (Post- Participant 9), and “it is a skill to be nurtured” (Post- Participant 3). One student captured this by writing, “I now understand that leadership is learned; it's not something you're born with but something you actively choose to do” (Post- Participant 16).

The aforementioned paradigm shifts, along with the concrete practices from the course content and the guidance from mentors and panelists, enabled students to see themselves as leaders in a new way and, consequently, act accordingly. Many students began implementing their new learning during the course of the term. For example, one student shared, “while I was taking this course, I was also a leader for a pretty big group project and using some of the skills that we learned in this course and then applying them in that project”. This student proceeded to connect this application to future leadership pursuits, “it gave me a lot of confidence in my ability to be able to do that again in the future” (FG- Participant 27).

Along with paradigm shifts, students also found newfound confidence in their abilities to lead after completing the course. When asked about how they felt about leading in the future during the focus group interviews, nearly every student commented with “confident” or “somewhat confident”. They attributed this to the stories from the textbook, the way the content was organized into big ideas and specific strategies, and learning from the mentors and panelists. Newly minted confidence was accompanied by a desire to grow and learn in their leadership. One student succinctly captured this by saying, “I'm very confident in not only leading people but also just taking the opportunities to grow and evaluate where I am as a leader” (FG- Participant 9). After stating their newly acquired confidence, one student shared, “I'm excited for my next leadership role to be able to apply some of that stuff towards leading other people” (FG- Participant 4). Another student attributed a growth mindset to a trait of a leader, “As a leader, I don't think you ever stop growing...you should want to continue to take opportunities and challenge your skills and abilities to be able to continue to learn, gain knowledge from all kinds of perspectives and grow” (FG- Participant 2).

Finally, it became clear that students were enthusiastic about pursuing leadership opportunities in the future by becoming involved in university clubs, organizations, and leadership programs. For several, this was discussed as an opportunity to “explore many paths of involvement” (LLP- Participant 4) in the hopes of discovering opportunities that align with their values. Several students had already taken action on this pursuit by joining a club, seeking a leadership position in a club, or applying for a leadership program. Students shared these commitments with feelings of excitement and pride. For example, two students shared, “After applying for the Leadership Academy, I can proudly say that I will be in the cohort for the

upcoming year” (LLP- Participant 12) and “I also applied for and was chosen for an officer position in the Collegiate Farm Bureau, so next year I will serve as the Treasurer” (LLP- Participant 6).

Discussion, Recommendations, and Conclusions

This phenomenological case study explored the ways in which first-year college students learned leadership and developed leadership identities in a small, low-stakes, leadership course. Throughout each ten-week term, students in Leadership Launch formed a community of practice, one which was welcoming, inclusive, and psychologically safe. Students attributed this to small class sizes, consistent moments of intentional connection between peers and instructors, and lessons that amplified student voices. These dynamics, strengthened by mutual respect among students, encouraged students to participate freely without fear of judgment. Students found the class to be an environment where they not only cared about each other but also pushed each other to learn and grow in their leadership. Set against the background of our chosen theoretical lens, students in this study found the Leadership Launch community of practice to be one in which learning, participation, and social engagement congregate to form new modes of thinking, learning, and meaning (Wenger, 1998). Such a community helps form social networks and supports Birtmingham et al.’s (2020) recommendation that college programs work to help students cope with stress and mental health challenges. Further, students found this community of practice to be a place where they mattered and were cared for. Their names were remembered and spoken, their well-being inquired about, and their opinion was solicited. This offers evidence that spaces like these may be just what our post-pandemic students need as they grapple with mental health challenges (Richel & Flanagan, 2022). Still, while class size, instructor care, curricular design, and pedagogical moves were attributed to the welcoming and participatory nature of the course, there is still room to explore exactly how the caring community was created. What specific mechanisms encouraged participation? What do students mean by the term “welcoming”? Were certain strategies more effective than others at building community? Future research, perhaps ethnographic or narrative in approach, should take a more nuanced view to explore these and similar questions.

As members of a community participate, develop identities, and make meaning, brokers aid their journeys. In our study, brokers (instructors, mentors, panelists) built connections for students, guided their thinking and opened doors for new possibilities. Wenger (1998) reminds us that the complex job of brokering must not be undervalued as it “involves the process of translation, coordination, and alignment between perspectives” (p. 109). Brokers, specifically the mentors and panelists, revealed their journeys through the landscape by candidly sharing stories of challenge and failure. This inspired students and allowed them to better imagine themselves as leaders (Wenger, 1998). Participants also appreciated the ways in which the mentors and panelists brought the content to life by communicating hypothetical concepts through stories of their lived experiences. Given our framework, we see the process of translation, coordination, and alignment as brokers articulated regimes of competence (those of college and career) across landscapes of practices (Wenger, 1998, Wenger-Trayner et al., 2015). Their brokering, as a result, built student confidence and shaped their leadership trajectories.

Participants in our study also appreciated the brokers’ willingness to take time out of their day to interact with students and attributed their modes of interacting through candid

conversations, vulnerability, and storytelling as pivotal in their learning and leadership identities. This finding is interesting given Wenger-Trayner et al.'s (2015) explanation that "brokering requires trust and legitimacy; it involves emotional management and supporting the learning experience". Because the brokers in these courses were pivotal players in the student experience, it does make us wonder how we can leverage brokers in new and different ways. Specifically, we are curious as to why stories of failure were so impactful for students; additional research could examine this phenomenon in-depth. Additionally, research incorporating the voices and perspectives of the brokers themselves would lend insight into how they can best guide student learning trajectories.

Student conceptualizations of leadership significantly shifted throughout the ten-week term. What began as an association of leadership with power, position, and authority shifted to one centered on caring for people and working together to achieve a common goal. Wenger (2009) describes identity as "a way of talking about how learning changes who we are and creates personal histories of becoming in the context of our communities" (p. 211). Paradigm shifts, a caring classroom environment, concrete practices from the course content, and guidance from mentors and panelists enabled students to "become" in new and divergent ways. Namely, they now identify as leaders, feel confident to enact leadership behaviors in multiple settings, and are committed to engaging in future leadership opportunities. Student leadership trajectories shifted because of participation and engagement in the Leadership Launch course. These findings are especially interesting when set against the backdrop of a post-pandemic world. The majority of our participants are female and, as we saw above, the pandemic has disproportionately negative effects on female mental health (Fruehwirth et al., 2021, NSSE, 2021). Could courses like this play a pivotal role in guiding young women starting college by reducing anxiety and providing the support they wouldn't otherwise receive as a freshman? While this study didn't specifically look at the anxiety rates of women during a course, this could also be an advantageous line of inquiry for future research.

Conclusions from a case study that adopted a social learning lens also position themselves to practical recommendations. When possible, we encourage class sizes small enough to allow students to get to know each other and allow for ample discussion opportunities in which each student has multiple and consistent chances to share their voice. Learning student names is no new suggestion, however, we can't emphasize enough the importance of this practice, as evident in the quote from the student who mentioned we were the only professors who knew (and used) her name. Additionally, it is important to build time to connect and inquire about student well-being. We also advocate making this a norm for the class, as it is not only important for the instructor to check in with students, but for students to check in with each other. Finally, the use of brokers played a pivotal role in how students learned leadership and shifted their leadership trajectories. Leveraging brokers who are willing to be candid and vulnerable may result in powerful impacts in both leadership and non-leadership courses.

If there is one thing the pandemic taught us, it is that we are not meant to live in isolation. Our college students are no different. Taking the entire study into account, it becomes clear that a central thread to this study was the importance of human connection. Human connection as a prerequisite for learning, human connection as a powerful tool for brokers, human connection as pedagogy, and human connection as a means to develop a leadership identity. As we continue to

navigate the post-pandemic environment, modify existing leadership programming, and (re)learn how to support our students, we encourage our peers to be intentional about participation, engagement, and well-being, and consistent with establishing moments of connection.

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Exploring the Experiences of Educators in a Practitioner-Oriented Master's Degree

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Abstract

In this study, we explored the lived experiences of secondary school agriculture, food, and natural resources (AFNR) teachers enrolled in, or who recently completed, a practitioner-oriented master's degree in AFNR Education at Michigan State University. Data were collected via semi-structured interviews, and interviews were informed by Appreciative Inquiry methodology. Ten master's students completed interviews and data were transcribed verbatim. Analysis followed an inductive, constant comparative approach yielding three themes: (a) synthesis experience a critical component, (b) the Master of Arts (MA) student/teacher identity, and (c) MA students having a need for connectedness and external support. Findings are presented with substantiating participant quotes. Lastly, conclusions and implications are discussed, including the value of the capstone master's project as well as the need for opportunities to connect while completing a distance graduate program.

Introduction

The quality of education relies on the abilities of educators; thus, efforts to enhance the knowledge and skills of teachers must be continuously implemented. One method commonly proposed for teacher improvement is completing a master's degree relating to teaching and learning (Knapp et al., 1990; Ward & Dixon, 2014). In this spirit, some school districts and states have encouraged, or even required, teachers to complete a master's degree (Horn & Jang, 2017). Supporters posit a master's degree bolsters teacher effectiveness while elevating social perceptions of the teaching profession (Horn & Jang, 2017; Knapp et al., 1990; Ward & Dixon, 2014). Opponents, however, note a lack of empirical evidence illuminating the positive impacts of a master's degree, teacher shortages, and the ever-increasing cost of graduate coursework as justifications for their stance (Knapp et al., 1990).

The data on teacher engagement in master's degrees suggests, required or not, a significant portion of educators have pursued this educational route. In 2011-2012, approximately half of teachers in the United States public school system held a master's degree (Horn & Jang, 2017). Investigating the data further, most teacher-held master's degrees (i.e., approximately 78%) are obtained by women (Zhou & Gao, 2021). Participation in master's degrees among teachers is high, however, the type of degree obtained has shifted. Evidence suggests a decline in teachers pursuing master's degrees focused on research; instead, teachers are pursuing master's degrees focused on the art of teaching (Ward & Dixon, 2014).

The predominance of research on teachers pursuing master's degrees appears to be peripheral to the lived experiences of teachers during their degree program (e.g., research on enrollment trends, requirement of master's degrees). As Ward and Dixon (2014, p. 165) noted, "little research centers on the personal nature of the journey of students." This gap in the literature fails to illuminate the most salient aspect of a master's degree, the teacher's experience.

Therefore, the current qualitative investigation focuses on the lived experiences of agriculture, food, and natural resources (AFNR) educators engaging in a practitioner-oriented master's degree in AFNR Education at Michigan State University (MSU).

Purpose and Objectives

The purpose of this study was to explore the lived experiences of agriculture, food, and natural resources (AFNR) educators engaging in a practitioner-oriented master's degree in AFNR Education at MSU, and included two objectives: (a) explore the challenges and successes of AFNR teachers pursuing a practitioner-oriented master's degree and (b) illuminate programmatic structures and norms which cultivate understanding and enhanced practice among teachers.

Literature Review and Theoretical Background

To guide the development of this study, our literature review is broken into three themes of existing scholarship, (a) student experiences during master's degrees, (b) outcomes of master's degrees, and (c) philosophic practitioner education.

Student Experiences During Master's Degrees

The master's degree experience starts with a teacher's consideration to pursue the degree. Research in the social sciences of AFNR suggests potential graduate students consider a variety of factors (i.e., funding, professional advancement, learning goals, institutional culture, and program flexibility) when making the choice to pursue a postgraduate degree (Shellhouse et al., 2020). Broader research on master's degree enrollment adds teacher efficacy and outcome expectations to the list of factors influencing teacher enrollment (Ward & Dixon, 2014). Uniquely, the opportunity to conduct research appears as a motivational factor for potential doctoral students but was not a consistently important factor for master's degree students (Shellhouse et al., 2020). However, those identifying research as a motivating factor envisioned research to be a mechanism through which to create positive change within education (Ward & Dixon, 2014). Across motivation types, students pursuing master's degrees begin with a strong sense of efficacy and a determined commitment to complete their degree (Ward & Dixon, 2014).

After enrolling in the master's degree, students begin to engage in the program curriculum. Lindner and Baker (2003, p. 50) noted students in AFNR Education have an expectation that coursework is "up-to-date, in line with industry standards, socially responsive, and pragmatic," drawing upon diverse fields of knowledge to aid them in achieving personal and professional goals. Regarding specific programmatic experiences in AFNR Education, only a handful of studies inform our understanding. These studies suggest online graduate students prefer limited student-to-student interaction (Moore et al., 2016) and that an in-class alter-identity experience can bolster cultural knowledge and cultural empathy among graduate students within the discipline (Hains et al., 2013). Outside the context of AFNR Education, extant literature suggests mentorship and advising are key determinants to the quality of the master's degree experience, with enthusiasm, interest, wisdom, adaptability, and humor noted as desirable characteristics among mentors of graduate students (Ward & Dixon, 2014).

Importantly, however, not all students have the same graduate experience. Research foregrounds challenges female graduate students experience within and external to AFNR Education. Specific challenges faced by female students within the discipline include microaggressions, lack of female role models, traditions of a male-dominant profession, and colleagues questioning their competence (Cline et al., 2020). These challenges likely contribute to a national trend of female students requiring additional time to complete postgraduate degrees (National Science Foundation, 2018). These challenges are made more salient by enrollment data suggesting an increase in females pursuing graduate degrees, across all disciplines, over the last 30 years (Ward & Dixon, 2014). While an increase in females pursuing advanced degrees is positive, this trend has not translated to an abundance of tenured female faculty members within AFNR Education (Cline et al., 2020).

Outcomes of Master's Degrees

Research into the outcomes of teachers pursuing master's degrees can be concatenated into three categories, (a) teacher internal outcomes, (b) teacher external outcomes, and (c) student outcomes. Teacher internal outcomes refer to the impact of a master's degree on a teacher's own knowledge and skills (Lindner & Baker, 2003). As noted previously, the body of research in this area is inconclusive; however, evidence suggests teachers can consistently expect increased self-confidence and self-esteem by completing a master's degree (Demb & Funk, 1999; Ward & Dixon, 2014). It is also noted the scope of teacher growth related to the master's degree may be determined, in part, by their awareness of the program expectations prior to engagement (Ward & Dixon, 2014).

The second category of outcomes, teacher external outcomes, focuses on benefits of engaging in a master's degree realized by teachers that extend beyond their development of knowledge and skills. These outcomes include advancement toward recertification, increased salary, and/or an annual stipend for completing a master's degree (Horn & Jang, 2017). In addition to these more structured benefits, master's degrees are sometimes viewed by school stakeholders (e.g., administrators, community members) as a representation of the teacher's commitment to the profession, making them more valued within their school and community.

The final category is student outcomes associated with their teacher obtaining a master's degree. Like teacher outcomes, research is inconclusive regarding student outcomes with some studies suggesting modest student gains and other studies suggesting no impact (Horn & Jang, 2017; Knapp et al., 1990). A variety of factors may influence the lack of clarity; specifically, the level of the students, the subject being taught, and the relevance of coursework completed by the teacher during their master's degree (Horn & Jang, 2017). Qualitative research investigating the complexity of teacher and student outcomes, like the current approach, is recommended to better understand the outcomes of teacher engagement in a master's degree.

Theoretical Framework: Philosophic Practitioner Education

As alluded to within this literature review, teacher experiences within a master's degree differ based on demographic characteristics (e.g., gender). Additionally, master's degrees within

the same discipline, but across institutions, are not the same (Knapp et al., 1990). For example, teachers can pursue a range of degree titles (e.g., master's of arts, master's of science, master's of arts in teaching, etc.). Program curriculum also shifts between degree programs, with some foregrounding scientific inquiry, others emphasizing teaching arts, and still others relying on field work (Critchfield, 2015; Knapp et al., 1990). Inconsistencies between programs suggests a decrease in clarity on the meaning, value, and impact of a master's degree for teachers.

In tourism higher education, a solution has been proposed: frame the outcome of graduate degree programs as developing “philosophic practitioners” (Tribe, 2002). A philosophic practitioner is an individual who understands, and can create, new knowledge within the discipline while also being able to apply new knowledge to their practice (Critchfield, 2015; Tribe, 2002). For teachers pursuing a master's degree, this would entail being able to (a) understand existing educational research, (b) create new knowledge through educational research, and (c) apply new educational knowledge to their practice. Proponents of the philosophic practitioner approach to graduate education suggest the curriculum within a graduate degree should fall in the middle of two key continua. First, curriculum should balance attention on both reflection and action. Additionally, curriculum should balance liberal and vocational emphases (Tribe, 2002). In this way, a philosophic practitioner better meets the demands of being a successful educator and is empowered to contribute to broader educational aims through the creation, consumption, and distribution of scholarship.

Methods

Our study followed a basic qualitative design outlined by Merriam (2002), while incorporating elements of Appreciative Inquiry (AI) (Anderson et al., 2016; Coghlan et al., 2003) into our interview protocol. Basic qualitative approaches are common in education research and follow an inductive process to understand participant viewpoints (Merriam, 2002). In this study, we utilized semi-structured, in-depth interviews facilitated by one member of the research team via Zoom in Summer of 2021. We received MSU Institutional Review Board approval prior to conducting the study.

Participants

All current and former AFNR Education MA students were invited to participate (13 AFNR Education MA students), with ten current or graduated students completing interviews ($n = 10$). All ten participants were active AFNR educators in Michigan within the first seven years of their teaching careers. For context, the MSU AFNR education MA degree is a distance-delivered, practitioner-oriented degree that incorporates twelve credit hours from a post-baccalaureate student teaching and requires a three-credit, capstone master's project.

Data Collection

Interview data were collected by one member of the research team who did not have advising or supervision responsibilities with MA students. We followed a semi-structured format for interviews as Flick (2009) posits semi-structured interviews allow for flexibility while still gaining understanding of participant viewpoints. While not following AI as a methodology, we

drew from it to inform our interview questions (Michael, 2005; Shuayb et al., 2009). Appreciative Inquiry originated in organizational development (Coghlan et al., 2003) and focuses on an asset-based approach. Coghlan et al. (2003) posited a model for AI that includes four stages: discover, dream, design, and deliver.

We used AI to frame our interview questions in an asset-based way by focusing on positive moments, best practices, and highest-points. Specifically, we draw from the discover and dream stages to inform our interview questions, and followed example questions from Cooperrider et al. (2003, p. 23) as cited in Coghlan et al. (2003). One such example question being “Describe a high-point experience in your MA program – a time when you were most alive and engaged.”

Data Analysis

Upon completion of interviews, all interview data were transcribed verbatim by a third-party transcription service, and participant confidentiality was honored by replacing participant names with pseudonyms. Data were analyzed via an inductive coding process following the constant comparative method (Glaser, 1965). Glaser posited four stages of the constant comparative method, including (a) comparing incidents to categories; (b) integrating categories and their properties; (c) delimiting the theory; and (d) writing the theory. The constant comparative method can be used as a coding process regardless of the presence of substantive theory construction (Merriam, 2002). As a research team, we operationalized this process by having a multi-stage analysis: first, the member of the team conducting interviews re-watched and coded interviews; then, two other research team members reviewed and refined the codebook.

Ensuring Quality

Several steps were taken to ensure trustworthiness and quality within the study. First, we engaged in reflexivity by examining our own biases and how they may influence the study (Merriam, 2002), increasing trustworthiness by increasing confirmability (Guba, 1981). Next, we triangulated data with multiple data sources (i.e., interviews and MA project documents) and multiple investigators to also enhance confirmability (Guba, 1981). Further, to establish credibility we engaged participants in member checking and completed multiple rounds of peer debrief throughout the research process (Guba, 1981). Finally, we provide thick descriptions to allow for judgements of transferability (Guba, 1981).

Subjectivity

A team of researchers engaged with this study, what follows is a discussion highlighting our viewpoints and thoughts as we entered into this process. First, while our program also offers master’s of science and doctor of philosophy degrees, as a team we view practitioner-focused master’s degrees as an important element of the educational system. Additionally, we approached this study from an AI perspective, meaning that we sought to discover what our MA students valued about the MSU AFNR Education MA program and included interview questions

written in the positive as opposed to the negative. Our intent was to gain an understanding of the value our MA degree program brings to practitioners in Michigan.

Findings

Three themes were identified by the research team: (a) *synthesis experience a critical component*, (b) *the MA student/teacher identity*, and (c) *MA students have need for connectedness and external support*. Each theme, category, and code are provided (see Table 2).

Table 2

Summary of Themes, Categories, and Codes

Theme	Category	Code
Synthesis Experience a Critical Component	Value and Impact	Hands-on or Creative In-person Discussions
	Capstone Project as a High Point	Project Sharing out
The MA Student/Teacher Identity	Transferability of MA to Career as Teacher	Developing Credibility Applying Learning as Teachers Student-focused Practitioner Goals
	The MA and Practitioners	Continuing Education Reflecting on Practice Accountability
	Structuring the MA for Practitioners	Individualizing the Program Teachers and their Time
MA Students Have Need for Connectedness and External Support	Desiring More Connectedness	Support Backloaded Discussion and the Project Programmatic Guides Cohort Building
	Feeling of Committee Support	Advisor Communication Advisor Relationships

In the following sections, we present themes and their respective categories and codes with substantiating participant quotes. To honor a theme identified in the study (i.e., teacher identities being that of a teacher and a student), participants are referred to as teacher-students.

Synthesis Experience a Critical Component

One of the emerging themes was the idea that the MA project, or the synthesis experience, was an important component for teacher-students. There was a value the capstone experience brought, and teacher-students frequently mentioned the benefits and rigor associated with the experience – whether they were completing a product-oriented project or a research-oriented project. The *synthesis experience a critical component* theme is explored by looking at its two categories: (a) value and impact and (b) capstone project as a high point.

In the category value and impact, we explore elements of the MA program teacher-students found rewarding or fulfilling. Among them, teacher-students often identified hands-on or creative endeavors within the MA as valuable learning experiences. One teacher-student referenced a course where they developed a walking stick as a high point experience, “like doing something like this where I'm physically arranging something or physically doing something.” Succinctly articulating preferences for hands-on learning, another teacher-student said, “where I tend to feel the most impacted is when things are occurring in that [hands-on] aspect.”

Another area teacher-students felt value and impact is during in-person discussions. “Sharing out,” “discussions,” and “motivated” appeared frequently within this code. One teacher-student provided a representative idea, “we were really motivated, you know, brought things to share to class each week, um, when we were still in person.” While teacher-students preferred in-person interactions, the first hints of their dual roles as teachers and students emerged as the same teacher-student suggested, “I get that that's harder to fit into people's schedules, but just with the way I learn, I do best to be able to actually talk with others.” Further substantiating the need for discussion, one teacher-student suggested it was the people element they missed,

I enjoy working with people. I enjoy working with groups. I enjoy having discussions....
Um, so working alone on my computer at home has been really challenging for me, um, because I find other things to do.

The second category within the *synthesis experience a critical component* theme was the capstone project as a high point, which explored the value teacher-students placed on their capstone projects – a process that was rigorous and engaged students deeply in the process of data collection and synthesis. Oftentimes these projects – whether research or product-oriented – focused on a concept relevant to the teacher-student, articulated well by this participant who conducted research on a new grading system and teacher adoption, “So I think to truly understand that [system] would be beneficial for me under, having some sort of scientific data to surround myself with would, would help me to wrap my mind around this whole concept.” In a similar vein, another teacher-student suggested “the project I feel like overall has been a lot more engaging because it is kind of like my thing.” While the relevancy of concept played an important role, teacher-students saw value in the end stages of their projects when synthesis was occurring, “I was most engaged, it was probably when I was closest to like presenting, and getting to the end and, um, again, just kind of at a point where I was synthesizing everything.”

Within the capstone project as a high point category, another emerging idea was the value the capstone experience brought for sharing out. One teacher-student put it succinctly regarding a high point experience with “my presentation to actually, um, to get to talk about it and show I completed this.” Associated with this idea was teacher-students who completed research, and the potential for other educators to use their data in a meaningful way,

...if an Ag teacher wanted to take the next step with that, um, looking at that data and taking it to their administration and saying, ‘This isn’t just something that I came up with, this is something that other teachers do or a lot of other teachers do or it’s something that, you know, is probably going to be impactful for our program.’

Similarly, another teacher-student who completed a less-research intensive project focused on facilities suggested,

...anyone else who's trying to convince their school board, superintendent, or community to get behind facilities can say, 'Hey, look, this, this is what happened [here]. They, their Ag teacher did all this research, look at all this data that they've collected.'

The MA Student/Teacher Identity

The second theme centered on the identities of participants, specifically how their roles as both teacher and student presented challenges and opportunities. The opportunities of those divergent identities are mostly presented in the category transferability of MA to career as teacher, which explores how the MA program contributed to teacher success and their goals for their students.

The first idea we explore is developing credibility, especially the projects. Referring to their research project, one teacher-student explains how it helped them connect with other teachers doing similar things,

It just helped me connect with staff 'cause we have, uh, at least three staff members that lead different study abroad programs, students. So, since that was the focus, I was able to like share all my materials with them, and get them engaged in what I was doing...

On a somewhat divergent path, one teacher-student described how their project helped them communicate with administration about facilities,

I was actually taking this information that I was learning... and I was talking about my project with my superintendent. And, uh, here we are coming up for a bond renewal... and I would say that because I had done all this research and that I had all this background knowledge, I really made a good case of why we needed these facilities.

There were also times when teacher-students referenced the MA program and learning influencing what they do within their own programs, represented by the code applying learning as teachers. The learning could originate within a course or other elements of the MA program, as one teacher-student elucidates how the project process impacted their thinking,

It just made me wonder what credits other Ag courses count towards and if there was a potential to change, um, the credits that my courses count towards and if that would make a difference in how students sign up for my classes.

Going from the macro (i.e., programmatic view) to the micro, another teacher-student highlighted the "little things" they've picked up throughout the program, "Like laboratory instruction, or induction course, technically my student-teaching courses, um, literacy, all little things." Finally, when talking about SAEs and their project, one teacher-student offers a thought emblematic of teacher thinking and their programs and MA learning,

After we're all done looking through things, I will have a better idea of how SAEs being...perceived as impactful...so I can make adjustments to my program to make it more effective for my own students.

An idea informing the theme *MA student/teacher identity* was student-focused practitioner goals. In this code, we explore how teacher-students kept a lens of that as practitioner while completing MA coursework and projects, using learnings to specifically grow their students. This diverges from the previous idea as it represents teacher-students actively adjusting their MA experience to benefit their students, instead of merely using ideas they may

learn as part of their MA to benefit their students. A representative instance was one teacher-student discussing their motivation behind their inclusivity minded project, “I was hoping for a more, I guess, inclusive classroom or calm classroom, a classroom where my students meshed better with one another.” Similarly, another teacher-student offered “a big driving force behind my project as a whole is just, you know, trying to help students of all kinds be successful in our program.”

The second category in the *MA student/teacher identity* theme centers on the MA and practitioners, exploring how the MA interfaced with teachers as professionals. In our first code, we look at continuing education and the idea the MA furthered teacher knowledge and influenced their practice. For some, that focus was apparent when discussing their project, as one teacher-student suggested,

The time to actually dive into actual research and the actual updated practices, it's different [than] having someone who is trained in these things come in that kind of has this scripted up, like...bang, bang, bang.

Others took a simpler approach, offering that the whole MA program benefits teacher practice, “I feel like they're [coursework and project] helping to really enrich and build on a teacher's skill level that will have an impact of the program level and the student level as well.”

In the next code we explore how the MA caused teacher-students to reflect on their practice and look at the big picture, so to speak. One teacher-student sums this idea up well, I think it's been...valuable to just slow down and actually focus on these things throughout a semester...as a teacher, we're going 400 miles per hour all the time, and so to just kind of stop and really dive deep into that stuff. I can feel it reflected in my practice.

Other, similar, statements were offered, including one focusing on an induction course as part of the MA, “just helpful to get me thinking about like my teaching philosophy...and where I wanted to go with classroom management.”

The final code within the MA and practitioner's category is accountability. Put simply, components of the MA program kept early career teacher-students accountable to what they know is good practice. Referencing the induction course, one highlight was “actually checking in like, okay, are you doing these things still in your practice that you learned the past two years?” Later, that same teacher-student shifted the narrative to forced reflection and accountability, “being forced to reflect through coursework is good because – especially as a first year teacher – there is no time to sit down and reflect.” Finally, in a quote that portends a finding we will discuss later focusing on advisor relationships, it was suggested the continuous relationship with faculty played a role, “That extra accountability for people that have been teaching me how to teach...are still here that I'm able to communicate with them if I run into any issues.”

The third category, and maybe the most influential, of the *MA student/teacher identity* theme is structuring the MA for practitioners. In this category, we explore coursework and programmatic elements that are valuable for practitioners – and it becomes evident that MA students have an identity as teachers first and foremost. In the first code we examine a succinct idea revolving around teacher-students' ability to individualize their program, and how it meets their needs. This idea was mentioned by multiple teacher-students, and referenced both the

project, “the project is based on what I wanted to do, and so that's been good” as well as coursework, “the way you can pick your courses is more flexible” and “flexible about what courses we take or what we do. I mean, they [committee], let me take an independent study because none of the other courses were really fitting.”

The second code we identified that further lends itself to the structuring the MA for practitioners' category is teachers and their time, where we explore the challenges of teacher schedules and responsibilities. At times this idea was at odds with learning, as one teacher-student suggested, “from a scheduling standpoint, it's really convenient to only have one or two Zoom sessions per class, but from a learning standpoint, I feel like it would be more impactful to have more that are structured.” Continuing down the path of balancing work and learning, another thought focused on surviving, “balancing a full-time job and going to school, that was a milestone in itself. Like last semester when I was taking two classes I finished and I was like, wow, that was a lot.”

MA Students Have Need for Connectedness and External Support

The third and final theme we identified focuses on teacher-students and their need for connectedness and external support and is comprised of two categories: desiring more connectedness and feeling of committee support. The first of these categories explores a need for connectedness from students who are not often on campus or in the same physical location as their MA peers. In a light, concise code substantiated by two teacher-students, we explore a backloading of support, even if the support was strong from the teacher-student's committee. For example, it was highlighted that efficiency is nice but early meetings are sparse,

I like efficiency and I like to get going with everything hitting the floor running. But on the other hand, uh, I also feel like, um, we didn't meet a lot... we've met more often now that I'm between the proposal defense and the project defense in that stage.

The need to meet more early in the program was a thought shared by another, “I kind of wish we would have scheduled meetings like, with our committee, like once a month.” While lightly populated, this idea aligns with the rest of this theme, and thus is included.

A potential support mechanism identified by teacher-students was connecting with peers in, or who had recently completed the MA program to discuss the project and other MA elements. For some this was informal, “just to know, like, who else is anticipating to finish their project when you are, and being able to communicate with them,” while for others it was more formally included in the program, “I think it would be cool if we did like, a group brainstorming or sharing of people who are also working on projects, preparing to present them, that sort of thing.”

Maybe the most relevant code for the connectedness category focused on cohort building, both with coursework and the project. While several teacher-students highlighted this desire, their focus was diverse. One focus was reflection and the value of communicating with peers, “just sharing what's happening, what challenges we're facing highs and lows as a group.” Others were focused on connecting and broadening their perspective, “the first class, we actually did a lot of group work, um, which was really, really helpful because we had an opportunity to actually talk to other people with different focuses and different experiences.”

In the second category, feeling of committee support, we explore teacher-student relationships with their advisors and committee. First, we look at advisor communication and the idea teacher-students felt their advisors were communicative and timely. One person connected the advisor relationship and communication to their professional role, “the professional communication between the committee and myself, working to understand that continuing that, um, has also definitely been a positive impact to me, uh, helping me understand my role as a teacher.” Another teacher-student highlighted the ease of communication, “the ease of communication and access to my graduate committee and helping me through those steps. They explain things very thoroughly. And if I have questions, [my advisor], he'll always get back to me like less than 24 hours.”

The second and last code for the committee support category, while succinctly supported with ideas from three teacher-students, further punctuates the advisor/committee relationship, where preexisting relationships with faculty serving as committee members were a contributing factor to teacher confidence. One person sums it up succinctly, “[I] have a good relationship with both [Faculty] and [Faculty]. So that gave me a lot of confidence.” Another teacher-student offered a similar thought, but focused on mentor caring, “I think the biggest confidence boost is knowing that I have two mentors in the program that care and want me to succeed and they make that very clear.”

Conclusions and Implications

In this study, we explored the lived experiences of AFNR educators engaging in a practitioner-oriented master’s degree in AFNR Education at Michigan State University. Findings from this study support prior research and potentially highlight some elements not addressed in the literature. Consistent with prior research, teacher-students oftentimes focused on the first and third outcomes of master’s degrees previously discussed in the literature review: teacher internal outcomes (Lindner & Baker, 2003) and student outcomes (Horn & Jang, 2017; Knapp et al., 1990). When discussing their experiences within the MA, teacher-students were concerned with their own growth – we see this coming through with quotes focused on their own growth as educators. Likewise, they were, arguably, just as concerned with their students and growth, with many describing how they maneuvered their MA experience to better their own students. If graduate students enrolled in research-focused MS and PhD programs are concerned with bettering the broader profession (i.e., macro), it is plausible teachers enrolled in practitioner-oriented programs are concerned with bettering their students/program (i.e., micro). This may be supported by the present findings that suggest teachers enter practitioner-oriented programs with the lens of a teacher. By entering with said teacher lens, teacher-students are concerned with identifying impact projects that can have a direct impact on their own students’ growth.

Potentially contributing to the focus on one’s own program and students, teachers in practitioner-oriented degree programs have less connection to campus and thus need interaction and support. Teacher life, especially early career educators, commands a significant portion of time, and when completing a degree program remotely it may be easy to feel disconnected from that institution. We identified within our data a strong element of appreciation for the support our MA students received during their degree programs – it was clear this is something they need

and wanted to continue. While graduate students enrolled in on-campus programs surely need similar support, students engaging in practitioner-oriented programs are distant physically and potentially retaining the mindset of practitioner more so than student. When combining this idea with the plausibility many practitioner-oriented degree earners are early in their career, it becomes equally important to engage students in interactive elements of instruction whenever possible, as structural barriers permit. One example of this may be the incorporation of in-person interactions as components of specific courses, such as courses offered during summer sessions or during evenings.

A third, and maybe somewhat surprising, conclusion focuses on the value of the capstone experience. Multiple teacher-students in our program entered rigorous research projects on their own volition, while the teacher-students completing a more traditional product-focused project frequently sought ways to increase the rigor of the experience. The impact these capstone experiences had was mentioned across participants and underscores the value of an experience tailored to the individual's needs that allows them to examine a component of AFNR education to improve their own programs. When considering this finding with that of a philosophic practitioner (Critchfield, 2015; Tribe, 2002), one can ascertain the teacher-students have connections to understanding knowledge in their profession and can create new knowledge, while also applying said knowledge to their practice. Through their capstone experiences, teacher-students were reflective in identifying the existing knowledge base but also actionable in considering how that existing knowledge, or lack thereof, could impact their practice, thus meeting the view of a philosophical practitioner.

Among the leading implications for practice emanating from our findings are for faculty/facilitators of practitioner-oriented programs to further consider in-person experiences for students enrolled in these programs. While this presents challenges, students value interaction with their peers and need opportunities to discuss coursework and topics of the learning at hand. If the first implication is challenging the second may be counterintuitive, and that is for faculty to value and cultivate strong capstone/project experiences. A key experience for our MA students was the rigor and applicability of a project that allowed them to examine some component of AFNR education. This experience was often cited a high point in their MA program. As a profession, we should strive to build challenging and applicable capstone experiences for our practitioner-oriented students the same as we would/do our research-oriented students. This may include, but not limited to, ensuring MA-pursuing teachers are pushing themselves to explore new knowledge and experiences as they consider impact project ideas with their committee.

Recommendations for Future Research

Continued research should focus on best practices for facilitating a practitioner-oriented degree program with students who retain the identity of teacher. Future research could employ quantitative approaches to gain a broader understanding of all AFNR education practitioner-oriented graduate students. Additionally, research could examine impact of in-person engagement events during practitioner-oriented programs. Finally, further research could include a pre-/post-survey to examine student knowledge gain during MA programs.

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A Call to Better Qual: A Philosophical and Methodological Examination to Advance Phenomenological Research

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Abstract

In 2007, Kim Dooley advanced a conceptual framework for qualitative work within agricultural education. To date, little has examined JAE's adherence to this call or promoted opportunity to further develop qualitative research within AAAE. In answer to Dooley's call, we specifically explored the key tenets of phenomenology, JAE's published work using this methodology, and opportunities for writers and reviewers to grow in undertaking phenomenological work. After illuminating the historical and philosophical tenets of phenomenology, we engaged a content analysis to examine JAE's adherence to the same. We offer this work as a guide and starting point for further development and rigor when using phenomenology to engage in qualitative work within agricultural education and propose recommendations to writers and reviewers looking to advance their phenomenological approach.

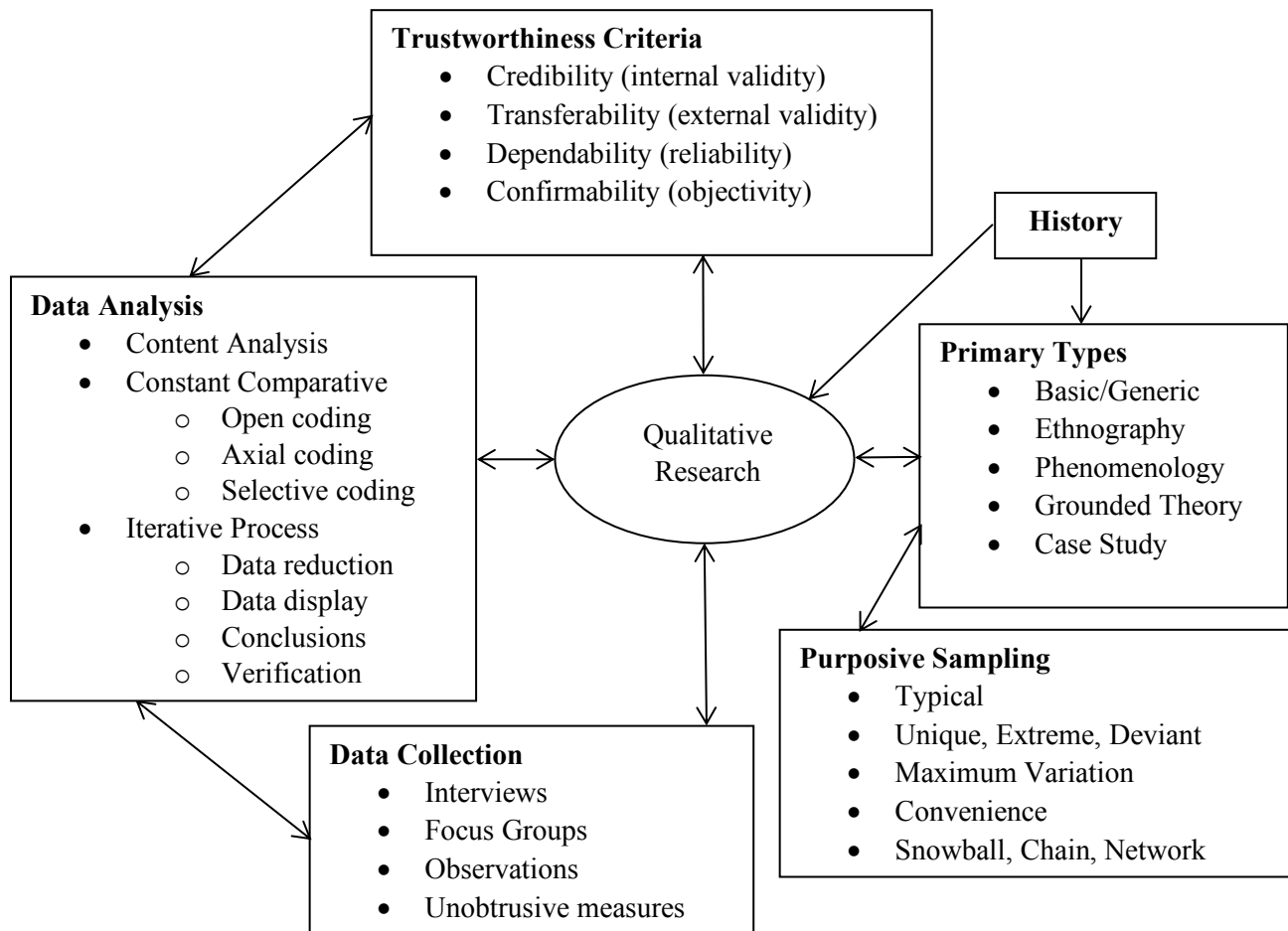
Introduction

“Life does not come to us like a math problem, but more like a story. There is a setting or context, there are characters or respondents, and there is conflict, or a problem to address” (Dooley, 2007, p. 33). In 2007, Kim Dooley exhorted the agricultural education professoriate to engage in qualitative research with rigor and quality. She argued that as a social science discipline, agricultural education research aligns with embracing tenets of qualitative paradigms. Namely, an interest in understanding the meaning people have constructed, participants' perspectives, researchers as instruments, fieldwork, inductive research, and rich description (Dooley, 2007). While the exhortation stands, adherence to its recommendations remains to be examined.

We know qualitative research in education commonly employs basic/generic, ethnographic, phenomenological, grounded theory, and case study methods (Dooley, 2007). Since Dooley's article, narrative and discourse methods, among other critical qualitative methodologies should be included as well. Dooley's content analysis and review provided a conceptual framework for engaging in qualitative research (Figure 1). To date, little has examined the integrity of upholding this framework within qualitative research in the *Journal of Agricultural Education*. Anecdotally, as research committee members, we have fielded angst from our qualitative colleagues. Furthermore, we have observed research engaging these methodologies accepted at lower rates and research only loosely engaging these methodologies upheld as high quality for our discipline.

Figure 1.

Qualitative Research Conceptual Framework for Agricultural Educators (Dooley, 2007)



Dooley's (2007) framework provides a starting point for understanding key differences between quantitative and qualitative methodologies. Recognizing her audience largely participated in quantitative methodologies, her framework was educational. Additional work is now necessary within specific approaches to operationalize across the widely differing methodologies that make up qualitative work. Each individual methodology has additional nuance related to its primary types and what constitutes rigorous purposive sampling, data collection, data analysis, and trustworthiness.

Knowing 15 years have passed since Dooley's (2007) exhortation, we took up the call to review the research since published in *JAE* to identify how our profession engages various qualitative methodologies. Our approach is part philosophical, part methodological, and

necessarily educational. As qualitative researchers, we are constantly seeking more robust qualitative research approaches from ourselves and our colleagues in agricultural education. The time has come to understand how Dooley's (2007) call has been taken up, but more importantly, to understand how to continually better qualitative practice in our discipline.

Without a doubt, this effort is a huge undertaking. As we considered exactly where to begin, we were struck by the number of phenomenological articles and presentations we had recently seen in our profession. As qualitative researchers, we recognized and continually experience the complexities and nuances that make conducting rigorous phenomenological research particularly challenging. For these reasons, we decided to take up Dooley's call to improve qualitative research in the agricultural education profession, starting with phenomenology.

Purpose & Significance

The purpose of this philosophical paper is to examine phenomenological research published in the field of agricultural education through a pragmatic lens. We aim to discuss this research with an eye toward improvement. We hope to add clarity to the hazy processes of phenomenology as a research method by providing a paper that can be used as an educational resource for our field. Much of the qualitative conversation within *JAE* is in its infancy. This work promotes conversation on a national level about the current state of qualitative research in the field of agricultural education and advances opportunities to engage in more rigorous and high-quality qualitative work.

Positionality & Aligning Assumptions

Because the researcher is often the instrument in qualitative work, the work itself can be highly personal, and this review is as well. Both authors teach and research using qualitative methods and have learned through the iterative processes and ambiguity that are hallmarks of qualitative research. We both work at Land Grant Universities in the mid-western United States, and this work aligns with our institution's mission related to teaching, research, and service.

In our own work, we have been struck by the vastness of individual methodologies within the qualitative discipline and offer this paper as an attempt to pare down an immense body of work into a meaningful and useful product for our discipline. Our work is a starting point, and the qualitative authors included should be referenced for their specific contributions and approaches to phenomenology.

For our part, we are pragmatic in our approach to research. The best methods are those which answer questions with integrity; there are a variety of ways specific methods are aligned to solving particular problems. Key to our review was understanding the alignment between research question, phenomenon, theoretical framework, and approach.

Additionally, we assume knowledge is socially and culturally constructed. Our interactions with the world result from our social experiences and cultural backgrounds. We recognize an objective reality with multiple interpretations and realities based on the multiple ways individuals experience the world. Ultimately, we are interested in authentic approaches that engage participants in working toward practical solutions.

Limitations

This paper is limited by both space and time to provide a substantially in-depth review of phenomenology. However, an in-depth review is not our goal. We seek to provide a practical resource that can be used to help us all improve in utilizing phenomenological methodologies and encourage readers to reference those cited for deeper understanding of the nuances related to phenomenology. In the same way, our paper is limited by focusing only on phenomenological research. Similar work related to the other qualitative methodologies is necessary to advance research in our discipline.

Finally, our review of research focused on the *Journal of Agricultural Education (JAE)*. We did not include regional or national conference submissions, knowing that several of those were subsequently published in *JAE*. However, we also acknowledge that quality, phenomenological studies may not have been advanced from regional and national conferences. We have published phenomenological research in other academic journals (Mott et al., 2018) and assume some of our colleagues are doing the same. Our analysis does not capture research outside of *JAE*, which says nothing of the nature or quality of work published elsewhere. This article aims to promote discussion of strategies to improve phenomenological research published in the agricultural education discipline.

Situating Phenomenological Research

Understanding Phenomenological Research

Qualitative research in *JAE* is a relatively new approach to solving problems and answering questions. The first article using “qualitative” in the title article appeared in *JAE* in 1992, just over 30 years ago. More robust, however, is the use and acceptance of qualitative methodologies outside of agricultural education. With strong foundations in philosophy, and disciplinary emphases in anthropology, education, political science, psychology, health sciences, social work, and sociology, applications and theoretical traditions can be as widely varied as the disciplines from which these methods develop. This provides both a rich practice from which to borrow as well as potentially discrepant applications based on underlying philosophical assumptions in individual fields.

This imposes incredible challenge, as with wide use comes incredible nuance within and across qualitative methods. A discourse analyst may not be well versed in the nuance of phenomenology, and a grounded theorist may not be well equipped to review or advise a narrative manuscript. Specific to phenomenology, there are vast differences in the types of questions answered by different *families*, or traditions, of phenomenology. Figure 2 outlines key features related to phenomenological traditions. Examining the philosophical roots of knowledge development is an important part of scholarship (Packard & Polifroni, 2002). Phenomenology, as a philosophical tradition, began in the 19th century to counter positivist thinking, which postulated that knowledge could be measured objectively and without human interaction. Phenomenology, however, presumes that knowledge is subjective and can be obtained from interactions between researchers and participants.

Figure 2.

Differences in Foundational Phenomenological Traditions

Edmund Husserl (1859-1938)	Martin Heidegger (1889-1976)
Husserlian transcendental phenomenology	Heideggerian hermeneutic phenomenology
Describes “what is it like to experience...”	Interprets “what it means to be...”
Epistemological focus (knowledge)	Ontological focus (meaning)
Pre-reflective consciousness of an experience	Considers context, tradition, and culture (being-in-the-world)
Clear, rich, compelling raw description of a phenomenon	Interpretation to uncover the meaning of a phenomenon
Positivist view of understanding phenomena	Constructivist leanings
Researcher uses <i>bracketing/epoche</i> to enhance neutrality	Researcher’s own prior understanding of the phenomenon is used to enhance the research process
Uses phenomenological reduction to distill the essence of experiences	Uses a back-and -forth approach between parts and the whole to create an interpretation
Scholars for further study: Giorgi (1985) Moustakas (1994)	Scholars for further study: Gadamer (1976), van Manen (1990)

For the purposes of this article, we focused on the origins of phenomenological research, examining the philosophies of “The Father of Phenomenology” (Edmund Husserl) and his student (Martin Heidegger). Most phenomenological scholars utilize the work of either Husserl or Heidegger as an “inspiration” for their work (Giorgi, 2000, p. 10), ascribing to distinctive features in one of the traditions while slightly deviating from or building on the original philosopher’s work.

We are intentional about pointing out where the methods of these foundational phenomenologists diverge. We believe this “back to the basics” approach is helpful for those wanting to gain a foundational understanding of phenomenology. We acknowledge there are many other phenomenological approaches we will not mention. Given our base-approach, we share Husserl and Heidegger’s philosophies are a starting point to understanding the foundations of phenomenological research from which to construct individual methods.

Husserlian Phenomenology (Transcendental Phenomenology)

Edmund Husserl (1859-1938), a mathematician, founded the philosophical movement of phenomenology as an alternative to the empirical, positivist approach to human science

(Spiegelberg, 1982). He considered experience to be the basis for knowledge (Draucker, 1999). With a focus on describing phenomena, he believed people were conscious and aware, knowing about their own experiences, perceptions, thoughts, memories, imagination, and emotions (Creswell, 1994). This was a radical approach at the time; one that was “ridiculed and laughed at” (Moustakas, 1994, p. 25).

Husserl’s tradition is referred to as *transcendental phenomenology*. Transcendental phenomenology relies on an epistemological view of the world, assuming that singular knowledge can be distilled into a pure phenomenon from collective experience. (Dowling, 2007). Husserl’s transcendental phenomenology sets out to determine meaning, deal with the essence of an experience, offer insight into the essence of things through what appears and through reflective description, and to obtain knowledge through thinking and reflecting (Farber, 1943). It emphasizes subjectivity, the discovery of the essence of an experience, using only things “as they appear” (Moustakas, 1994). Husserl’s method involves referring to “the things and facts themselves, as these are given in actual experience and intuition (1975, p.6).

An important identifying feature of transcendental phenomenology is the researcher setting aside their own presuppositions and understandings about a phenomenon. Husserl collectively used the terms *phenomenological reduction* (deriving the essence of the phenomena in study), *epoche* (removal of judgement), and *bracketing* (objective removal of the researcher’s experience and meaning making) to describe this phenomenological attitude (Stewart & Mickunas, 1990). These terms work together to eliminate a researcher’s bias about a phenomenon.

Another core aspect of transcendental phenomenology is the use of *imaginative variation* to sort what elements should constitute the essence of the experience (Giorgi & Giorgi, 2003). A textual description then portrays the meanings and essence of the phenomenon (Moustakas, 1994).

Those reading phenomenological research may frequently encounter the names Moustakas and Giorgi. These well-known scientists were greatly influenced by Edmund Husserl, and we find their texts helpful in understanding transcendental phenomenology at a deeper level. Although both authors have made some revisions and adaptations to Husserl’s original approach, many of his tenets remain in their phenomenological methods.

Heideggerian Phenomenology (Hermeneutic Phenomenology)

Martin Heidegger (1889-1976), a student of Edmund Husserl, broadened phenomenology by focusing on “being in the world” instead of “knowing the world” (Reiners, 2012). Heidegger did not believe it was truly possible to set aside one’s own understanding and experience of a phenomenon, suspending previous understanding. Rather he contended investigators can ask deeper questions and better understand experiences through their own prior understanding and reflections (Dibley et al., 2020). Heidegger began to move phenomenology from pure description to interpretation through hermeneutics.

Hermeneutics originally focused on the interpretation of scriptural texts (Dibley, 2020; Crotty, 1998). *Hermeneutic interpretation* considers both experience as well as underlying

dynamics or structures, with the intention of uncovering what may often be hidden behind the objective phenomenon (Crotty, 1998). To begin grasping the foundation of Heidegger's way of thinking, one needs to wrestle with the concept of "*Dasein*" (Heidegger, 1927/1993, p. 20). Roughly translated into English, *Dasein* is "being in the world." Human existence (*Dasein*) can be interpreted and understood more deeply by examining language, culture, social situations, historical backgrounds, and everyday experiences (Benner, 1994).

In Heidegger's tradition, context shapes meaning; phenomenological thinking does not exist in a vacuum, but notices and considers outside events and influences. In Heidegger's hermeneutic phenomenology, the voices of the researcher and participants together provide the way phenomena are illuminated and disseminated. Experiences and knowledge of the investigator become part of the findings, serving as valuable guidelines that add meaning to the research (Humble & Cross, 2010; Lopez & Willis, 2004). Heidegger argued all descriptions are already interpretations (1962); we cannot help but understand the world just by being in it, and this colors all our own descriptions. His approach allows the researcher to 'bring certain background expectations and frames of meaning to bear on the act of understanding' (Koch, 1996, 176).

Well-known philosophers and human scientists whose research methods are grounded in the Heidegger's philosophy include Gadamer (1976) and Van Manen (1990), among others. Each of these individuals added to or edited certain tenets of the hermeneutic approach, but many of Heidegger's underpinnings remain in their writings. We appreciate the accessibility of both Gadamer and Van Manen's texts, and recommend those pursuing hermeneutic phenomenology spend time exploring these authors.

Situating Phenomenological Research in *JAE*

With these tenets of phenomenology in mind, we turn to the *Journal of Agricultural Education* to review our (the discipline's) use of this methodology. We engaged in a conceptual content analysis (Krippendorff, 2004; White & Marsh, 2006) to provide a snapshot of the publication of phenomenological research in *JAE* since 2007. We sought to identify the existence of concepts in the given text (White & March, 2006), in this instance, the Journal of Agricultural Education.

We reviewed *JAE* since 2007 (the publication year of Dooley's call for more robust qualitative work in *JAE*) for articles using "phenomenology" and "phenomenological." We found 25 articles with these search terms from 2007 through November 2022. These were organized by author, title, and publication year. Using an Excel spreadsheet, we examined the articles to identify concepts, including family of phenomenology, theoretical framework, presence of hallmarks of phenomenology, year of publication, and identified phenomenon.

The 25 reviewed articles were written by 57 authors, with an average of three authors per manuscript. The majority of authors (43, 75%) were only listed on one manuscript. Nine authors had two phenomenological publications, and five had three publications. Ten of the 13 authors listed on multiple publications were listed as first authors.

Only one article in *JAE* from the last 15 years referenced a family of phenomenology (Heideggerian Hermeneutic). Four others described their studies as transcendental (one), descriptive (one), and hermeneutic (two by the same author). The rest made citations to Creswell (2013), Moustakas (1994), Crotty (1996), Stewart and Mickunas (1990), Moran (2000), Bogdan and Biklen (2003), Van Manen (1990), Polkinghorne (1989), Lukes (2005), Lester (1999), Sloan & Bowe (2014), Lindseth and Norberg (2004), Lincoln and Guba (1998), Lopez & Willis (2004), McConnell-Henry et al. (2011). Without detracting anything from notable scholars in qualitative research, much of the citation in *JAE* focused on broad overviews from textbooks to general qualitative methodology, rather than specific ontological, epistemological, and methodological alignment. Many of these references aligned with specific forms of analysis or individual nuances of approach. In addition, five articles made no reference to the phenomenological methods with which the study aligned, and three cited case study methodologists (Merriam, 2009; Yin, 2012).

The phenomena under study were often as in question as the theory employed to study it. Phenomena included ascribing meaning to time, teacher effectiveness, decision to teach, teacher collaboration, student apathy, involvement in agricultural education, resilience, decision making, content knowledge acquisition, mid-career teachers, international experience, female agriculturalists, learning, inquiry-based instruction, motivation, multi-membership, mentoring, and meaning of livestock production. Without alignment to families of phenomenology, we are not in a strong position to identify the above as phenomena. However, this list raises several questions. Regardless of the phenomena, and in light of the families of phenomenology outlined above, several of the articles did not identify “what it is like to experience...?” (Husserl) or what does it mean to be...?” (Heidegger). Regardless of the family of phenomenology ascribed to (or not), little in the articles reviewed supported clarity in identifying the broader collective experience or specific meaning under study. We are at a turning point for phenomenological research in *JAE*; exploring a specific experience does not inherently make research phenomenological. Rather, we need to consider this important question: “*What can we see when we look closely, deeply, around, and through the phenomena of interest?*” (Dibley et al., 2020, p. 7).

Certainly, we see continued growth and evolution in applying phenomenology in agricultural education research. Considering a steep learning trajectory to move from heavily quantitative to attempts at qualitative methodologies, we have come a long way from tables of quotes. Especially in the last five years, stronger attempts are moving phenomenology from the study of experience to an in-depth attempt to derive essence, distill themes, and intertwine theory with methods where appropriate. However, additional work is needed to support advancing phenomenological research methods in our discipline.

A Call to Better Qual

As we have seen, phenomenology is a complex research methodology involving incredible nuance beyond “lived experience.” We have intentionally chosen to simplify this article in an attempt to make it more useful to novice qualitative researchers. We know many currently conducting qualitative research are self-taught or minimally instructed in qualitative methodologies, and we share this review to grow and learn together. We commend those who

have attempted phenomenology in agricultural education and look forward to continuing to grow in this methodology with you.

While we do not know when a concerted effort for qualitative training among Agricultural Education Ph.Ds. gained a foothold, we do know that even today, a few doctoral programs in Agricultural Education do not require qualitative methodology courses for their graduates. Of the sixteen programs with available course requirements for their Ph.D. programs, six did not list a specific qualitative course on their program guide. Furthermore, little supports continued growth in qualitative methodology once scholars leave their graduate programs.

We are not suggesting those who have stumbled with employing phenomenological methods in the past should no longer engage in phenomenological research. On the contrary! We ourselves have experienced significant shortcomings in our own work and included ourselves in the authors reviewed above. Research is an evolving process, and if researchers are willing to learn and grow in their practice, there is room for them to engage the methodologies necessary to advance teachers, communities, and students. In addition to a call for additional support for scholarly growth in qualitative methodologies, we also share the following recommendations to advance stronger writing in phenomenology and some best practices for reviewing phenomenological work.

Writing Phenomenology: Moving Beyond “Lived Experience”

Defining Experience

A notable challenge across phenomenological research in *JAE* since 2007 was identifying a phenomenon. Phenomena include the entire human experience, both the easily observed and the hidden (Dibley et al., 2020). While a cursory look at a lived experience can be easily taken for granted, unpacking, or stripping away the initial meaning can help uncover what is usually unseen (Sokolowski, 2000). This effort takes us much closer to the essence of the phenomenon.

Most often in *JAE*, phenomenon was defined as a *lived experience*, but not unpacked in a way that took the reader to “the heart of the matter—that which is significant or meaningful” (Dibley et al., 2020, p. 8). Many phenomenological articles lacked thick description; one that captured the experience of the participant in its fullest and richest complexity (Denzin, 1989; Geertz, 1973). Furthermore, in most articles little to nothing was said about “what it is like to be...?” (Husserl) or “what it means to experience...?” (Heidegger). Salient to this challenge in identifying phenomenon are subsequent and related challenges to situating methodologies historically and philosophically.

Methodological Alignment

We see from our review that references to phenomenologists selected for alignment with desired approach rather than philosophical alignment. Choosing a phenomenological research method that aligns with one’s philosophical assumptions is vital for research credibility (Reiners, 2012). Furthermore, the process of writing about one’s philosophical assumptions helps prompt critical thinking and reflection to begin (Cohen et al., 2000). Authors may not know where to look apart from where they have already been directed, so we see an abundance of cursory references without substance in *JAE* phenomenological articles. To this end, we caution readers

against pulling broadly from our list of references, as these include misuses of supporting authors from other articles. Instead, we encourage authors to review Figure 2 for direction in further study when employing Husserlian or Heideggerian philosophy.

To preempt alignment challenges in writing, we challenge authors to review Dooley's (2007) guide for conducting qualitative research in terms of the philosophical assumptions of the family of phenomenology best aligned with answering your research question. In drafting methods, review your phenomenologist's history, assumptions, and theoretical approach to the methodology. Identify others who have employed a similar approach as examples to support your means of undertaking phenomenology. Then explicate the alignment of the type of phenomenology you undertake in terms purposive sampling, data collection, data analysis, and trustworthiness criteria. This is certainly complex, iterative, and will vary by family of phenomenology and question. We would do a severe disservice to the profession if we attempted to simplify the complexity of phenomenology into a single figure to capture Dooley's (2007) key tenets. But we would not be offering a true call for better qualitative research if we did not vehemently encourage authors to engage this work in their own studies.

Depth & Substance

Another significant challenge across the reviewed articles was a lack of depth and substance. Most often, findings were non-revelatory, aligning with the research questions easily, and missing the dissonant and discrepant details qualitative research is poised to elucidate. While a challenge, this connects issues in identifying phenomena and philosophical alignment. If we are unclear on the phenomena being explored relative to our research questions, we will likely not unearth new and revelatory findings.

Those publishing qualitative work in *JAE* may feel some angst at these recommendations, and perhaps rightly so. We are asking for additional elaboration and backgrounding, while asking authors to uphold the "thick and rich" description of findings that is foundational to qualitative research. We would be remiss if we did not ask our conferences and journal to consider manuscript length implications related to our findings. Providing enough space to elaborate qualitative work is both necessary for understanding and educative for future endeavors. By not permitting substantial space for this type of work, we pass along a mediocrity that may not be reflective of the actual study rigor or clearly communicate the essence of the phenomenon.

Reviewing Phenomenology: A Non-Phenomenologist's Guide

Since our review only addressed articles accepted for publication in *JAE*, we were unable (and not attempting) to make comparative claims between accepted and rejected articles. However, we know from our own efforts through the review process that quality work is often dismissed because it is misunderstood or does not easily align with the scoring framework. In addition, our pool of reviewers for qualitative work is limited to those who acknowledge a willingness to score related work. A discourse analyst may not be well situated to review phenomenological work (and vice versa), but they are willing to try. If we only scored based on methodologies in which we were expertly versed, our review process would meet an unsustainable backlog and we would likely see even fewer qualitative publications in *JAE*. We

are deeply grateful for those engaged in reviewing qualitative work, and offer the following, based on the newly proposed *JAE* rubric, to guide review of phenomenology.

Impact of Contribution

The new *JAE* rubric asks reviewers to make assessments of the article relative to the literature supported argument justifying study importance, extension of what is known about the topic, importance of the contribution to the field, and relevance to current or emerging issues. Even here, methodological and philosophical alignment are critical. In considering qualitative work in *JAE* broadly, we appeal to reviewers to consider impact beyond findings. Particularly for qualitative research, and phenomenology specifically, the impact may be sound methodology. Perpetuating credible methodologies is a key impact scholars leave for each other in future studies. Strong methods advance our profession.

In reviewing for high impact methods, reviewers may find wide discrepancy in the application of phenomenological approaches. For example, structures and theoretical frameworks may be entirely avoided in hermeneutic phenomenological work. Similarly, the order of inclusion may vary widely, recognizing difference in epistemological (Husserlian) and ontological (Heideggerian) approaches.

Additionally, alignment is critical to methods contributing to our discipline's understanding of qualitative approaches. Data analysis techniques must align, including the language used throughout the manuscript. This alignment not only contributes to the impact of the study to the profession, but the trustworthiness and credibility of the study in itself. For example, it would not be appropriate for Heideggerian phenomenologists to do member checking given the interpretive approach considering the views of both the participants and the researcher. Strong alignment in cited methodologists should persist throughout manuscripts, following aligning means of addressing key aspects of the study.

Academic Rigor & Accuracy

Academic rigor and accuracy are defined by the proposed new rubric as sound and accurate approach, context aligned data collection and analysis, reasonable interpretation, accurate and trustworthy information, sufficient evidence, and address of limitations. This is perhaps the most obvious place for alignment related to methodology. Figure 2 provided a helpful starting point for both writers and reviewers in aligning key philosophers with their methodological contributions. There is far too much nuance among the families of phenomenology to unpack in text. However, we can offer broad considerations, and do encourage authors to explicate their alignment with the philosophical assumptions of their chosen phenomenologist.

All phenomenological research requires that researchers reflect deeply on their own experiences. While transcendental approaches require researchers to attempt setting aside or bracketing out their own experience (Stewart & Mickunas, 1990), hermeneutic manuscripts should include how the researcher's own understanding of the experience and context helped create the interpretation of the phenomenon (Dibley, 2020). Approaches to research project design, data collection and analysis should align with the family of phenomenology chosen for

the researcher's work. This will further enhance the trustworthiness of phenomenological work. While general frameworks, such as Lincoln and Guba (1985), provide guidance to qualitative researchers in general, other frameworks designed for particular traditions of phenomenology (e.g., De Witt & Ploeg, 2006) may also be particularly helpful throughout the entire research process.

Phenomenologists may choose to use field work or data analysis techniques from other qualitative approaches. However, when selecting these it is important they are appropriate philosophical matches and that research is rigorous (Cohen et al., 2000). Additionally, data collection and analysis sections should include appropriate methodological citations supporting the researcher's processes and decision making. Indeed, the influence of the philosophical tradition should be evident at every stage of the research process (Dibley et al., 2020).

Style & Structure

Finally, the new rubric defines style and structure as organization supporting readability, clearly communicated purpose, effectively summarized conclusions, clear and correct writing, and completeness. We offer a special note as it relates to all qualitative research: Completeness (i.e., all relevant sections are included) may not follow the traditional introduction, literature review, theoretical framework, methods, findings, conclusions outline. In fact, in some branches of phenomenology, whole sections of the traditional manuscript would be inappropriate. For example, a Heideggerian phenomenology does not typically include a theoretical framework because that structure forces a linear way of thinking instead of allowing revealing to take place in a way that reflects the complexity of what it means 'to be' (Dibley et al., 2020). We cannot overemphasize the importance of researchers thoroughly understanding the phenomenological tradition they choose to use and utilizing processes and structures that align philosophically and methodologically with that tradition.

It is incumbent upon authors to clearly communicate and align their methods. In fact, we encourage all submitting a manuscript to see this as an opportunity to help educate reviewers in the field (who are often also our colleagues) about phenomenological research. However, it is also incumbent upon reviewers to approach qualitative frameworks with which they may be less familiar with an open mind, welcoming the learning opportunity. We are well past the time to write qualitative work to a solely quantitative audience and score it as such. That said, the style and structure of a phenomenology should align throughout the manuscript. There is little room for phenomenology to cherry pick from widely differing schools of thought within or even outside of the methodology, especially in terms of what it means to engage with the phenomenon.

In Conclusion

Improving qualitative work across our discipline is a team effort. Instead of simply identifying themes, rich and rigorous qualitative work captures the layered, nuanced, and often discrepant voices that tend not to fit the patterns described via other methods. We know this will not be our last call to better qualitative research, and we hope it is not yours either. As the field of qualitative research continues to evolve and we grow in our methodologies, we must be willing to explore work outside our discipline. Phenomenological approaches have been used in

the fields of anthropology, political science, psychology, health sciences, social work, sociology, and others. Much can be learned from exploring the methodology utilized in these disciplines. The opportunity for growth and development through learning from other disciplines is too great to ignore.

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SAE for All Implementation in North Carolina

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Abstract

SAE for All was introduced by the National Council for Ag Education as an innovative method of implementing SAE instruction and better serving all students in agricultural education. States have varied on whether and how they have pushed forward the new model for teachers. In North Carolina, the model was rolled out through statewide professional development in 2019 and subsequently integrated into the curriculum. The authors sought to understand how teachers were implementing the innovation. This phenomenology utilized qualitative interviews with thirteen teachers with various educational backgrounds, single and multi-teacher programs, years of experience, and across those who taught in middle and high schools as well as urban, rural and suburban communities. Themes report what is working, what is not working, and how teacher philosophy played a role in the implementation of SAE for All. Suggestions for how various stakeholder groups can influence implementation are provided.

Author Note

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Introduction

Supervised Agricultural Experience (SAE) is a work-based learning project for students in School-Based Agricultural Education (SBAE) and is one of the three major components of agricultural education (The National Council for Agricultural Education, n.d.). This portion of SBAE is often credited to Stimson's (1919) home project for farm boys in vocational agriculture classes (Croom, 2008; Moore, 1988; Smith & Rayfield, 2016). In recent years, SBAE teachers have been implementing a form of the "expanded model for SAE" (Moore & Flowers, 1994, p. 18), which offered students seven types of projects and had two possible outcomes of the project, (1) agricultural literacy or (2) connection to an agricultural career (Moore & Flowers, 1994).

Unfortunately, as SBAE and SAE have evolved over time, the SAE project has not maintained relevance among all SBAE teachers (Marzolino & McKim, 2022; Steele, 1997; Wilson & Moore, 2007). Admittedly, teachers are not incorporating SAE in their programs or not requiring all students to maintain an SAE project (Lewis et al., 2012; Steele, 1997; Wilson & Moore, 2007). Even though they are reportedly not practicing SAE completely in their SBAE programs, SAE is still touted by the same teachers as highly valuable for students (Retallick, 2010; Wilson & Moore, 2007). Opportunities such as building technical and life skills, encouraging positive relationships, and helping students prepare for their future careers are all considered highly valuable benefits of SAE participation (Ramsey & Edwards, 2012; Retallick, 2010; Rubenstein & Thoron, 2019).

SBAE teachers have indicated many perceived barriers to implementing SAEs in their programs. The National Council for Agricultural Education (The Council) (n.d.) specifically addressed time, student enrollment, agricultural background, resources, administrative support, and understanding of SAE as barriers for SAE implementation. In an effort to combat these perceived barriers, addressing the need for a clearer purpose and guidance for SAE has been called on time and time again through research (Doss & Rayfield, 2019; Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007).

The Council formed a committee in 2011 to redesign Moore and Flowers' (1994) SAE model to be more accessible and attainable for all SBAE teachers and students (The National Council for Agricultural Education, n.d.). The SAE for All philosophy addressed this need and was adopted in 2015 (The National Council for Agricultural Education, 2015). This new model redefined the definition of SAE to be "a student-led, instructor supervised, work-based learning experience that results in measurable outcomes within a predefined, agreed upon set of Agriculture, Food and Natural Resources (AFNR) Technical Standards and Career Ready Practices aligned to a career plan of study" (The National Council for Agricultural Education, 2017, p. 2), aligning the purpose of SAE with the needs of today's SBAE students. The SAE for All model has all students completing individualized foundational and immersion projects that move through five areas of learning (1) career exploration and planning, (2) employability skills for college and career readiness, (3) personal financial management and planning (4) workplace safety, and (5) agricultural literacy (The National Council for Agricultural Education, 2017).

SAE for All has been addressed during multiple workshops at the National Association for Agricultural Education (NAAE) Convention since 2015 and implementation guides for teachers and students were created and disseminated in 2017 (SAE for All, n.d.). Despite the communication and availability of high quality implementation resources, SBAE teachers have been slow to learn and implement SAE for All in their programs (Doss & Rayfield, 2019). Unsurprisingly, implementation of new practices has historically plagued the acceptance of new SAE models (Dyer & Osborne, 1996). In North Carolina, terminology was updated in the state curriculum in 2018 and the SAE for All model was rolled out at the CTE Summer Conference in July 2019 (Joshua Bledsoe, State Director, personal communication, October 2022). Since North Carolina SBAE teachers have been expected to utilize the SAE for All model for multiple years, there is a need to understand how teachers are incorporating it into their programs.

Theoretical Framework

This study was guided by Ajzen (1991) Theory of Planned Behavior. Teachers are working within their perceived control. Their actions will proceed as long as they perceive they have the ability to be successful and as long as they are not prevented from acting on their desired behavior by outside forces beyond their control. Within a school, this could include administration, parents, students, other teachers as well as forces within the teachers' personal life. A person's behavioral intentions are also impacted by how strongly they look favorably or unfavorably upon that behavior. These behaviors are also impacted by subjective norms,

which is how a person perceives their community and those around them expect them to behave. Agriculture teachers operate not only in their school and local community but also within a larger community of agriculture teachers.

Purpose(s)/Objective(s)

The purpose of this qualitative study was to explore SAE for All implementation among SBAE teachers in North Carolina. In this research, “SAE for All implementation” will be generally defined as using the SAE for All model and guides created by The Council with students. The research question guiding this study was how is SAE for All being used in SBAE programs in North Carolina?

Methods/Procedures

Qualitative research is utilized when there is very little known about the subject being studied (Creswell & Creswell, 2018). Specifically, a phenomenological study, “describes the lived experiences of individuals about a phenomenon as described by participants” (Creswell & Creswell, 2018, p. 13). This phenomenological qualitative study aims to gain a better understanding of SAE for All implementation among SBAE teachers in North Carolina. A phenomenological study has been selected due to the developing nature of SAE for All implementation in North Carolina. SAE for All was rolled out in the state in 2019, therefore a shift to this new model should be happening in SAE expectations and requirements across the state. These findings address one portion of a broader study into SAE for All implementation.

Data Collection

Participants were selected through purposive sampling to gather a representative sample of the state teacher population (Merriam, 2009). The state teacher population at the time of the study was approximately 570 teachers. Criteria considered when working with state Agricultural Education staff in identifying potential participants included representation of all regions in North Carolina, teacher education pathways, years of experience, program size, and program community. Participants were contacted via work email between April-June 2022 and study inclusion criteria consisted of: (1) Current North Carolina School Based Agricultural Education (SBAE) teacher, (2) At least one full year of experience as a SBAE teacher, and (3) Include Supervised Agricultural Experience (SAE) as a component of your SBAE program. Participants indicated through a Qualtrics consent form their willingness to participate in the study and scheduled an interview time through email.

Individual interviews were conducted with thirteen participants (see Table 1) between April-June 2022 yielding more than five and half hours of interview data which were transcribed verbatim from recordings by the researchers. The semi-structured interview protocol consisted of eight questions that related back to the guiding research question, but also followed up on items brought up by each individual. The questions were (1) Tell me about how you are using SAE for All in your classes. In your program?, (2) What have you had to create or change within the guides to make it work for your program?, (3) What successes have you/your students experienced through the use of SAE for All?, (4) What barriers are keeping

you from (fully) implementing SAE for All?, (5) What resources do you think are needed to help agriculture teachers to fully implement SAE for All?, (6) How are you using AET ?, (7) What (if anything) are you planning to change with SAE for next year?, and (8) Is there anything else you would like to share about SAE for All?.

Table 1
Participants

Pseudonym	School level	Teachers/ Program	Community	Years Teaching
Tammy	Middle	1	Urban	2
Patsy	High	1	Suburban	3
Reba	High	1	Rural	4
Naomi	High	2	Rural	5
Loretta	Middle	1	Suburban	5
Kenny	High	2	Rural	5
Dolly	High	3	Rural	8
Rosanne	High	1	Rural/Suburban	10
Randy	High	2	Rural	11
Emmylou	High	3	Urban	14
Willie	High	4	Rural	18
Keith	High	3	Rural	24
George	High	2	Rural/Suburban	25

Data Analysis

Several methods of data analysis were used to provide an accurate representation of how SAE for All is being implemented in North Carolina. During interviews, researchers made memos to record their reactions, thoughts, and emerging themes. Data from the transcribed interviews were coded by both researchers to identify major themes. Researchers then compared their themes to confirm findings. Trustworthiness was established through rich, thick descriptions. Direct quotes throughout the findings are used to provide the clearest overview of the phenomenon of implementing SAE for All in SBAE classrooms in North Carolina. Reliability was established through continuous review of coding and clear communication between both coders working with the collected data. The limitations of this study are (1) the study only includes teachers from North Carolina and (2) findings may not be generalizable beyond the sample.

Reflexivity

Researchers worked to control their bias throughout the process by bracketing their experiences, writing memos during the study, and talking about findings during each stage of the study. Both researchers are involved in the agricultural education profession. Both taught SBAE in North Carolina and required their students to have SAE projects. One researcher utilized SAE for All in her program. Both researchers work together to teach the experiential learning course for agricultural education students at North Carolina State University where students are learning about SAE and SAE for All. These experiences have positively shaped both researchers' opinions of SAE and SAE for All and will allow them to be aware of possible

successes and challenges in implementing SAE for All, but also may impact their interpretation of themes and findings.

Results/Findings

When looking at how SAE for All is being used in the state, three themes were constructed from the data: what is working, what is not working and SAE philosophy.

Theme 1: What is working.

There were pieces of the new SAE for All model that were quickly adopted, adapted and or implemented by participants. Participants were consistent in their plans for expanding school-based enterprise SAEs. George shared that “we're trying to get some more school-based enterprises going and I think kids are really getting excited about that. Because they can go out and do those things they can see it and touch it and feel it and experience it.” While Randy noted “using SAE for All has made me understand this more, you can use those school-based projects to make them to be more successful.” For her middle school students, Tammy has plans to “cut back on some of the ideas, because I give them a very long list of ideas...I'm going to narrow that down a little bit and try to make it a little more school based.”

Others were more specific in their school-based enterprise projects and plans like Kenny and Dolly.

We do have a shop facility and I've actually had, I think, five or six girls in my animal science one class, and I do woodworking on the side, they were asking me questions about it, or we were talking about SAE, I use that as a example of like, ‘you know, I build furniture here at school, I utilize the facilities here, I buy, I purchased the lumber and the fasteners and everything and, from the money I make, I put that money back into facilities, replacing blades and stuff like that,’ so overall it's a mutual benefit, but if I were a student, the way that looks is I would maybe I would charge like ‘hey [student] you want to use the shop whenever you get down to project and sell it let's just donate 10% of that profit back to the program or something.’ That way it's a realistic kind of business scenario. (Kenny)

I got an SAE for All grant, so I guess every student in the chapter was part of that because they all had a part in that. We made a sensory garden for the exceptional children on campus so every member helped in some capacity with that and they all logged their hours through the AET with that and their picture. (Dolly)

Participants also shared an increased interest in Agriscience Fair for their own students and seeing other SBAE teachers rise to the challenge of incorporating research in their programs. Kenny shared how

one of the big things about this new SAE model that I really got intrigued with was the idea of a research SAE. I never did Agriscience Fair, but you know always see the displays at conventions and it's always intrigued me, and more and more I thought about like I tell my students this, you may take your inventory of resources that you have at home or at work and you may have something to work with you may not have

anything but everybody, no matter where you're at resource-wise can do some form of research project.

While Willie shared his belief that other teachers are purposefully choosing not to encourage students into research projects, stating he believes that [students are] capable of more than what we've given them credit for. The problem is that their ag teachers are limitations and a lot of that with the agriscience fair is, I'm going to say, confidence. Confidence in the scientific process, or coming up with the idea, it seems overwhelming to the ag teacher so it's easiest if I don't mention it because then I don't show that I am incompetent with it.

The career exploration and employability skill areas were being explored. Participants believe SAE for All has helped students plan for their future careers. In multiple cases, participants indicated that SAEs were especially helpful in removing potential careers from students' interest lists. Dolly shared:

Immersion SAEs helped her students narrow down careers. I have 260 kids, you know 10 or 15 that have a proficiency which will probably lead to their career paths, but the other ones figure out more or less, this is what I don't want to do, or I got these skills from this, but that would fit better in this other career is, how can use it in this other career. Like, when [my student] worked on a beef farm, but she knows, she wants to be a nurse now, she doesn't want to work with animals, she wants to work with people, so I think it helps it does help them figure out what kind of careers, they want to go into but it eliminates the ones they don't want to go into.

Patsy credited the foundational SAE in helping her students plan for the future. She stated:

It's a success for this student and I'm trying to tell myself it wasn't a loss on my part this past year, I had my one of the guidance counselor told me about a student that really wanted to go to vet school, but she was coming in, as a junior this past year, so she only had two years with me to kind of go through all the classes and stuff. And so we got her in the classes, she had me in fall and spring this past year and she did the SAE for All twice, she was one of those students and at the beginning of this spring semester, she told me, she was like 'I really love that career exploration thing' she's like. 'But I have to say I think I want to do what it told me, I think I want to do aerospace now I don't want to be a vet anymore' and I'm like that's so awesome for you. But I was trying to win you over for something in agriculture, but that is one and so um she still went through the classes and stuff but I'm so glad that she figured that out now, before getting into animal science or a vet program and figuring out like 'You know what, I don't want to do this'.

Dweck (2006) coined the term *growth mindset*. Multiple teachers demonstrated a growth mindset when it comes to SAE. There were multiple examples of teachers phrasing their approach to SAE in a way that indicated they may not have it all figured out yet, but they see themselves as evolving and getting better. Rosanne talked about trying to fit the old SAE model into her suburban community and said "I was really frustrated with it, and it was going to take that summer to try to figure out what I could do differently." Rosanne added "that was

about the time that SAE for All was rolling out and I was like this makes sense, this is what I need as a teacher and I think this is what my students need to be more focused on, careers.”

Kenny talked about his multi teacher program seeking alignment and being willing to adapt. They meet to discuss “Okay, ‘what does SAE look like this semester, or for the school year’, dictate all the parameters and talk about some different ideas of what to try differently”. This idea that even though they have done SAE before, or for multiple years, these teachers do not think they have it figured out, yet. Specific to the SAE for All guides, Rosanne said “I think the guides are good, but there's... a lot of parts to it and so, I think, as a teacher, we need to make the decision of what to use and what not to use.”

Reba talked about the balance between those who want to excel in the SAE awards structure and those who do not. She stated

I try to meet the middle between those kids who really care and they want to earn their State and their American Degree and the kids who just want to get a good grade in class and move on to the next. So we try to meet in the middle so they're all getting something beneficial from the program.

Willie did indicate that “I have to be so flexible in my program for students, you know, because to get an SAE for all of ‘em ya gotta be flexible enough to ...offer them an experience outside of my class.”

Emmylou wanted to give her urban students the opportunity to do something relevant to them and not just something that met the traditional SAE criteria stating,

I think it helps every kid find something to do because you know, most of our kids don't just naturally have something that counts and so it's not us standing with every one of our kids one-on-one like ‘okay, well could you paint your garage? Could you, you know...’ like coming up with like it kind of gives them more creativity, it makes them feel less like it's a waste of time if they don't want to do an ag career and it just gives us flexibility in like I got this kid like that wants to try, but you know what can I have them do that type of thing.

A number of teachers indicated that they believe SAE for All can work, but would like to see examples of programs implementing the model really well. Kenny said

We got to have somebody that's doing this and doing it well, has true evidence of success of, like, by doing this foundational approach is leading directly into and connecting to an immersion. If I can see that by somebody else, and I'm hoping it's out there, somewhere, then it gives me a little bit more ‘okay, it does work, it is possible,’ it's not just me chasing an imaginary carrot.

Theme 2: What is not working

The general consensus among teachers was that COVID has hindered their progress in implementing SAE for All. Many participants echoed Rosanne in that “

the one thing that kind of made it complicated, though, was COVID hit and that just unfortunately was the thing. I would say, not just for myself, but a lot of teachers that

I've talked to, if there was something that we had to weed out in order to just survive through all of that personally, SAE was one of those things.

However, Loretta was an outlier in her take on teaching SAE through COVID. She stated

luckily I've kind of taken it, I'm taking advantage, during COVID, focusing on SAEs so like when we were 100% virtual that was basically your assignment in ag. We did little online stuff but, for the most part, you have to do some type of project SAE and that really actually helped SAEs in my program because that was our focus.

With the tiered levels of SAE for All, alignment across multi-teacher programs has been especially challenging. While some multi-teacher programs have communicated about SAE and maintain their philosophical differences, others have not addressed a plan to align at all. "There are four ag teachers [in] my program and we all value SAEs differently and now you've got into a bag of worms...there's no doubt that 50% of us find it more important than the other 50%." (Willie) "I cannot speak for [teaching partner's] classes, he's a little different than I am" (Naomi)

Teacher misconceptions about SAE for All and incomplete understanding of the model have also led to challenges for implementation. Multiple teachers referenced foundational projects as being anything that did not directly relate to agriculture, like Dolly's statement in we don't discourage foundational because some of them that's what they need, a lot of these kids were on free and reduced lunch one hundred percent so a lot of these kids have to have their jobs, you know, to help with their families, but we do make have some kind of ag aspect to it, even if they don't want to do an ag career eventually.

Or Reba's comment that "with SAE for All we've been able to implement students using their job as their SAE project is like a foundational project and that's more geared towards students who don't have anything agriculture [or] anything else available to them." Naomi also said that "Level two we don't necessarily focus on foundational as much just because once they've already done it one time it's just kind of refreshing it a little bit in the level two courses." Participants also struggled to see the value in having their students connect foundational activities with immersion SAEs. Several participants shared similar sentiments were as Kenny,

there's some students that they have what would be defined as immersion experiences in the model so those kind of more traditional hands on SAEs and if they have those when they come to us...we want to focus on that more than the foundational side and so that's been kind of a little bit of a tricky challenge of like we need to do this and 'check that box', so that we can focus on what you have.

Naomi also indicated that foundational was "like resume cover letter stuff and kind of looking into things that are happening in agriculture, while the immersion one is something that might interest them a little bit more in a specific area."

When thinking about her middle school students, Tammy reflected that she learned about SAE for All in her teacher education program and was excited to use it, but when she

took a job at the middle school she felt “like it, even the foundational one, is a little bit too much for the middle school level...I feel like if there's maybe a level underneath foundational like exploratory it might work better for middle school.”

First-generation performance based measurement (PBM) requirements introduced many teachers to foundational activities. North Carolina’s initial curriculum roll out was a one-size-fits-all approach of using the intermediate SAE for All student guide as a PBM in classrooms. This approach presumed all students were at that level. This removed the individualization built into the SAE for All model. Even though he had used the foundational guides in the previous year, George admitted “I thought I had a really good handle on PBM, found out I didn't. It just, I hate to say it, but the foundational stuff got put, SAE got pushed, to the back burner this year.” Others, like Reba, said she found the “SAE for All worksheets and resources because that was actually linked in the PBM. That's how I found out about it and started using it.”

Several participants referenced the lack of alignment between SAE for All and FFA Proficiency Awards as concerns. Some teachers are measuring SAE success by degrees and proficiencies, like Randy who shared “we're actually looking to hire eventually down the road like six students, two for horticulture, two for animal science, two for ag mechanics and then they-on all those programs that will all be proficiency areas and all count as SAE hours.” With awards driving SAE for some teachers, the alignment of SAE with the award structure was discussed. Reba stated

when you when you look at those award applications, I mean I think they're getting better, but most of them are still geared towards those traditional SAEs of working on a farm working with animals, raising the you know species of livestock, they're they're kind of the proficiency award areas are still mostly geared towards those traditional SAEs you think about. So. I don't know don't know how you could shift gears to accommodate for students who are doing an exceptional foundational SAE other than like you know the job interview as like CDE and those sorts of things so it's something definitely to think about, but I would, I would say, as of now proficiency awards are more geared towards traditional SAE projects.

In our interview with EmmyLou, she talked about being challenged with how foundational hours “count” in state degrees. “I mean if we can have that streamlined everything counts or doesn't count for degrees, I think that language would help tremendously, just because I mean, it's confusing to us, so I know it's confusing the kids.” She identified ways to use the same hours but set them up differently within the AET and indicated the uneven application of this process would advantage those students whose SBAE teachers could or would work to help them through the process of rearranging their experiences to “count”.

You have some teachers that are working the system to get their kids what they think their kids deserve and then some teacher saying ‘sorry it doesn’t count’ like ‘you can't get this degree’ or ‘you can’t apply for this award’.

This research conversation led to a proposal in the summer of 2022 to the state board of directors to make clear policy about using foundational hours for state FFA degrees. The next step will be to work with the team at the AET to solve implementation issues and we will still

need to navigate what to do with those hours as they count toward American FFA degrees. There is currently no clear policy.

There were teachers who talked with language indicating a fixed mindset when it comes to SAE. Willie told us, when speaking of his multi teacher program, “we've had a lot of success with the old way that we've done it, and so the desire or the push to transition to something new just doesn't seem like it's necessary”.

Theme 3: Teacher SAE Philosophy

The veteran teachers indicated that changing their ideas around SAE at this point in their career has been difficult. Keith indicated that he and his two teaching partners are close to retirement and acknowledged “I mean we've got four or five years left so sometimes it's hard to change your ways of doing things”. Rosanne shared how she believes “we're all kind of stuck in that same idea of what traditional SAE is and it's a tough thing to kind of to move from, especially when you get kind of set in your ways it's really hard.”

For some, they see the model as the same, but now there is a foundational hurdle to get past before their students can do SAE. For example, Emmylou indicated her multi-teacher program is working on “adapting the levels better so like I've got this kid in level one but he's already had level two for [my teaching partner]. He doesn't need to be doing foundational stuff again”.

Others indicated that they are open to a new model, but that they do not perceive the SAE for All model to be *ag enough* for them. George stated

It's hard for me to accept that it doesn't necessarily have to be honest-to-goodness ag.

That bothers me and so sometimes it's kind of hard for me to get excited about it because I feel like if we're going to do SAE you know, let's go ahead and get them into an immersion project and get them actually doing something. So I guess, if I'm going to really make it work I've got to figure out some philosophical questions there.

Conclusions/Recommendations/Implications

This study illuminates the current level of SAE for All implementation and highlights areas where improvement is needed. As we conducted interviews and reviewed the data, it became apparent that our teachers do not understand the purposes of foundational SAE in the SAE for All model. There are many reasons this could be happening. It did launch right before COVID. Many people may have missed the one initial roll out that happened so continued professional development and/or train-the-trainer events will help.

It is important to note that the task of implementing SAE well is a big request of teachers. This is not a new issue in our profession considering the many ways that SAE has (and has not) been implemented in the past (Marzolino & McKim, 2022; Retallick, 2010) despite the fact that nearly every study measuring importance of SAE has found that teachers highly value SAE. The intricate nature of moving a program full of individual students through multiple years of individualized SAE growth and advancement to provide each student with

career preparation for their individual goals is not an easy task for anyone. When you layer on the innovative nature of SAE for All, teachers need a model of success they can look to for guidance. They need to see a teacher who is able to implement all of the lofty and worthy goals of SAE while teaching the state curriculum and serving the local community well with the FFA program. The challenges of aligning philosophically can be compounded when a program adds multiple teachers. Perhaps a model with three separate circles which only slightly overlap is an outmoded image and teachers need to more consistently see a message that much of what they do in their classroom is SAE. The inclusion of school-based enterprise has opened this door. The idea of foundational activities fitting into the curriculum would allow every student to begin the SAE journey during class. If more teachers understood this foundational aspect and its inclusion in the classroom, perhaps more students would be served by SAE.

While some may say the “tail is wagging the dog”, research shows and teachers clearly told us in these interviews that FFA awards and degrees are driving what is happening in the classroom with SAE (Bird et al, 2013; Rubenstein & Thoron, 2019). This is directly related to the theory of planned behavior (Ajzen, 1991) and the subjective norms of working within the agricultural education profession. Until these very visible FFA metrics of success evolve to include or even celebrate all of the components of SAE for All, integration will continue to lag for teachers. As the saying goes, *what gets rewarded gets done*.

We initially struggled with where we were seeing a shift among our teacher group. While we initially thought perhaps it was aligning to teacher career phase, it also appears the teacher mindset is playing a role. This shift appears consistent with Shoulders and Toland’s (2017) findings that millennial teachers have a stronger desire to incorporate SAE in their programs. Those teachers who can see themselves as only a few years from retirement indicate they are reluctant to change something they do not see as wholly broken while others indicate that SAE for All was taught to them in their teacher education program and is the only pathway to SAE integration they have ever known. Those in the middle were most interesting. Some appeared to be philosophically influenced by their teaching partners while still others were seeking innovation in SAE out of frustration with how SAE was not working for them under the old model. This is a group that needs guidance and influence from teacher opinion leaders. Using those late career, growth mindset teachers to set the stage during training is critical for teacher buy-in.

It is important to note that, as we think about the diffusion of SAE for All in the state, our State FFA Staff are critical change agents (Rogers, 2003). As change agents, state staff hold a unique role that can positively impact the decisions teachers make concerning SAE for All implementation in their programs (Rogers, 2003). Many participants indicated they only used SAE for All the first time because it was embedded in the curriculum as part of the PBM. The ability to drive change through requirements whether that be in curricular integration or as a part of mandated professional development, external motivation can be a tipping point for someone considering an innovation. The same can be said of our teacher education programs. There are four teacher education institutions in North Carolina and only two have a course fully dedicated to SAE for All and experiential learning that is required of those in the undergraduate licensure pathways.

We did hear from teachers that they felt the launch of SAE for All went a long way toward solving many of their issues with SAE. It gave a clearer pathway for students who did not walk into the classroom with a *built-in* immersion SAE. Elliott and Lambert (2018) offered the term rural privilege as a way to describe, in part, “rural students whose family has the financial means and space to engage in larger SAE projects” (p. 208) and students who’s “family experiences and knowledge, particularly in production agriculture, may give them an advantage over urban students” (p. 208). Further, these authors asked: “should we continue to assert that non-rural students can engage [SAE] differently, pursuing an agriscience research project for example, or should our profession work to provide opportunities that rural students might enjoy such as raising livestock?” The teachers in this study from more urban and suburban environments talked about trying to apply an outdated model of home or farm projects when the alternatives were equally mismatched. We firmly believe the profession is on the right track with a model for SAE that serves all students, regardless of career interest and access to land or livestock, but continue to push for a philosophical shift in leadership, teacher education, FFA awards structures and other external forces that are in ways big and small, perceived and actual, preventing teachers from serving all students with SAE.

Lastly, we heard loud and clear from those currently at a middle school or who have taught at middle school that SAE for All is missing a level, needing something lower than what is currently offered in the SAE for All guides at the Awareness level. While the model shows awareness as appropriate for students in grades 6-9, our classroom teachers suggested putting the 6th graders at the same level as a high school freshman was not working and that middle school students needed something more exploratory and introductory in nature. We recommend the SAE for All committee currently at work on revisions consider this pre-awareness option.

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An Exploration of Consumers' Intent to Engage with Social Media Misinformation Related to Agricultural Hemp and Cannabidiol (CBD)

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Understanding influences on the spread of online misinformation is critical to the future success of agricultural and science communications. One agricultural topic that has been associated with misinformation is agricultural hemp, which many consumers find challenging to distinguish from marijuana. Additionally, health claims sharing misinformation that overstate the benefits of the hemp product, Cannabidiol (CBD), are commonly shared on social media. Using the Elaboration Likelihood Model (ELM) as its framework, this study sought to better understand how consumers engage with social media misinformation related to hemp and CBD. An online survey was distributed to an opt-in, non-probability sample of 367 Nebraska residents in February 2022. The survey contained an experimental design that randomly presented respondents with one of three videos about hemp and CBD with the following content: (1) neutral information, (2) negative misinformation, and (3) positive misinformation. Findings indicated that negative misinformation was perceived as less credible than the other messages and respondents were less likely to engage with negative misinformation social media posts. However, respondents viewed positive misinformation the same as neutral information messages. Additionally, respondents appeared to reply on peripheral cues when evaluating hemp and CBD (mis)information messages, which could make them more susceptible to misinformation.

Introduction

Online misinformation has been a growing area of concern in recent years with the increased use of social media. Misinformation is the presentation of inaccurate information that might overstate or distort facts opposed to telling an outright lie (Carpenter, 2023). Misinformation can often be perceived as catchy and spread quickly in online environments (Ratkiewicz et al., 2010), and beyond being shared by word-of-mouth, social media misinformation can be spread through engaging with posts containing misinformation. Engagement in this context would include reacting/liking, commenting, and sharing (Kenan, 2022). Engagement with online misinformation is critical to understand because social media platforms like Facebook will increase the overall reach of posts based on engagement (Barnhart, 2019), thus leading to even more people being exposed to misinformation. The rapid spread of misinformation is particularly concerning when considering scientific topics because information contradicting scientific facts or promoting conspiracy theories have become more common in recent years (Howell & Brossard, 2021).

One topic surrounded by misinformation and misunderstanding is agricultural hemp (Colclasure et al., 2021; Rampold et al., 2021). Hemp production and processing has been legalized in the United States since the passage of the 2018 Farm Bill (Johnson, 2018). Opposition to hemp legalization was apparent and critics argued that it would be difficult to distinguish between hemp and marijuana, causing challenges for drug enforcement (Kent et al., 2021). Some political leaders, such as those in Nebraska, believed legalizing hemp would provide a pathway for

marijuana legalization (Young, 2019). Where hemp and marijuana are both forms of *Cannabis sativa* and have similar physical characteristics (e.g., leaf shape, smell), substantial differences in the genetics, chemical composition, and end-products between the two plants exist (Adesina et al., 2020). By legal definition, hemp contains less than 0.3% delta-9-tetrahydrocannabinol (THC), the psychoactive cannabinoid that causes a euphoric ‘high’ when consumed. Proponents of hemp argued that the crop could rejuvenate the agricultural economy (Cherney & Small, 2016), while also providing environmental benefits (Ahmed et al., 2022; Jenkins, 2016; Rehman et al., 2021).

The hemp industry has continued to evolve in the last half-decade since its federal legalization. The legalization and introduction of a new crop with regulatory complications and limited prior research and development has not been without its challenges. Gaps in infrastructure (Stevenson, 2017; Johnson, 2018), approved pesticides (Wortman & Dweikat, 2020), financing (Barker, 2020; Dingha et al., 2019), and educational resources (Adesina et al., 2020) have caused substantial problems for many farmers who were early adopters of hemp. A volatile market and concerns of market saturation have also eased excitement (Wortman & Dweikat, 2020). Additionally, low consumer understanding of agricultural hemp and misconceptions between hemp and marijuana are apparent (Colclasure et al., 2021; Rampold et al., 2021). Cherney and Small (2016) stated that these public misconceptions with marijuana may impede the viability of hemp to become a mainstream agricultural commodity. None-the-less, some hemp products have seen rampant growth in consumer demand. Most notably, floral hemp grown for the production of cannabinoids, particularly cannabidiol (CBD), has become the largest sector of the modern hemp industry (United States Department of Agriculture [USDA], 2022).

CBD has emerged as a leading supplement in the health and wellness market with global sales of CBD-products of nearly 3 billion USD in 2020 and projections to 55 billion USD by 2028 (Fortune Business Insights, 2021). CBD is increasingly being used for medical or therapeutic purposes (Burr et al., 2021; Zeiger et al., 2020). Reports have indicated that approximately 14% of U.S. adults use CBD products (Brenan, 2019). In a study on CBD use among young adults, Wheeler et al. (2020) found that approximately 40% of respondents have used CBD products, with intentions to relieve stress (65%), relax (54%), and to improve sleep (42%). The researchers also found respondents to believe that CBD products provide health benefits that are not based in medical or scientific research. Furthermore, the results of their study indicated that users are incorrectly determining dosages with over half of respondents reporting negative side effects.

Merten et al. (2020) examined how CBD was portrayed on the social media platform Pinterest and found that over 90% of pins (messages) contained a positive portrayal of CBD for physical or mental benefits. Findings also indicated the user engagement was high with over 80% of pins being saved. However, the researchers also found that nearly all pins did not mention the potential side effects or recommended dosage of CBD, nor were reliable public health sources represented. In a study using machine learning to examining CBD claims on Twitter, Soleymanpour et al. (2022) analyzed over two million tweets from marketers referencing CBD. The researchers found the main therapeutic claims of CBD to be pain (31.67%), anxiety disorders (27.11%), sleep disorders (13.77%), and stress (10.37%). These findings confirm the FDAs warning to consumers about unproven health claims from manufactures selling CBD products. Smolev et al. (2021) examined interactions about CBD in public Facebook support

groups for brachial plexus injury. The researchers concluded that information, misinformation, and strong opinions regarding CBD exists, and they believed these social media interactions to have the potential to influence treatment decisions. Similar misinformation was found to be widespread in crowd-funding campaigns, such as GoFundMe, for CBD-related treatments for cancer patients (Zenone et al., 2020).

The increased use of social media along with alarming rates of health misinformation on these platforms presents a critical challenge for public health (Chou & Gaysynsky, 2020) and agricultural communications. Misinformation on social media channels about hemp products, such as CBD, is highly evident. Therefore, the purpose of this study was to explore how consumers engage with social media (mis)information related to agricultural hemp and CBD.

Theoretical Framework

The Elaboration Likelihood Model (ELM) served as the theoretical framework for this study (Petty & Cacioppo, 1986). This theory proposes that individuals cannot give equal time and consideration to each piece of information they are exposed to throughout the day. Therefore, people use different processing routes to evaluate messages and guide changes in behaviors and attitudes – these routes include the central (active) processing route and the peripheral (passive) processing route (Petty et al., 2009). Individuals' motivation and ability to process the presented information will dictate which processing route move through (Petty & Cacioppo, 1986). Motivation to process information can include a person's prior experience with the topic (Petty & Cacioppo, 1986) or how they typically enjoy considering, understanding, and organizing relevant information, which is called their need for cognition (NFC; Cohen et al., 1955). Ability to process information is more closely linked to knowledge of the subject because people are more likely to carefully consider information they are familiar with than unfamiliar subjects (Petty & Cacioppo, 1986). When individuals possess high motivation and ability, they are more likely to engage in active information processing through the central processing route. In the central processing route, individuals will engage in high levels of elaboration, where they put considerable thought into the relevant information presented in the message (Petty & Cacioppo, 1986). When there are high levels of elaboration and the message leads to a change in attitude, these changes in attitude are usually long-lasting and predictive of behaviors (Petty & Cacioppo, 1986). However, when motivation or ability to process the information is lacking, individuals will not exert a lot of mental effort analyzing the message and instead will move through the peripheral processing route (Petty & Cacioppo, 1986).

In this peripheral processing route, individuals rely on peripheral cues, like message source or images, to guide attitudes. The shifts in attitude experienced in the peripheral processing route are typically not long-lasting nor are they predictive of behaviors (Petty & Cacioppo, 1986). Message credibility is an example of a peripheral cue, and accounts for the perceived quality, accuracy, and believability of the message (Li & Suh, 2015; Metzger et al., 2003). Message credibility is important to consider because it can determine to what degree people will adopt the viewpoint of the message since people pay less attention to information they do not believe (Gazziano, 1988).

Past agricultural communications research guided by ELM has determined most consumers use the peripheral processing route to analyze agricultural information (Frewer et al., 1997;

Goodwin, 2013; Meyers, 2008; Ruth & Rumble, 2017). This passive processing of information is likely linked to the United States' declining understanding of agricultural practices ties to agriculture (Frick et al., 1995; Kovar & Ball, 2013; Meischen & Trexler, 2003), which would limit both motivation and ability to process information. When considering hemp in particular, research has established consumers possess a low level of knowledge related to hemp cultivation and composition (Colclasure et al., 2021; Rampold et al., 2021), which would hinder their ability to use elaboration, therefore relying on the peripheral processing route when exposed to hemp messaging. If consumers must rely on peripheral cues to form attitudes when presented with hemp information, message sources, frames, and credibility become important influences on consumers' attitudes (Lundy, 2006).

If consumers are using the peripheral processing route when exposed to hemp information, they may not be considering the information closely enough to distinguish between accurate information and misinformation, which can lead to negative effects on the industry and for individuals. It is equally important to understand what influences consumers' intent to engage with and share online misinformation to develop practices to help limit the proliferation of misinformation on social media. Therefore, ELM was used to understand how consumers interacted with and evaluated (mis)information message about agricultural hemp. Motivation to process the message was conceptualized as recent CBD products purchases (personal relevancy) and NFC (Petty & Cacioppo, 1986), and ability to process the message was measured through knowledge of hemp. Elaboration was also measured in this study along with message credibility, which was considered a peripheral cue for the purpose of the research. Finally, the dependent variable of interest in the model was intent to engage with a (mis)information social media post about agricultural hemp.

Purpose & Objectives

The purpose of this study was to explore how consumers engage with social media (mis)information related to agricultural hemp. The following objectives guided this study:

1. Describe consumers' NFC, knowledge of agricultural hemp, and prior purchases of CBD products;
2. Describe consumers' message elaboration, perceived message credibility, and intent for social media engagement when presented with different online (mis)information related to agricultural hemp and CBD;
3. Determine the effect of message (mis)information of consumers' message elaboration, perceived message credibility, and intent for social media engagement; and
4. Determine how message (mis)misinformation, hemp knowledge, CBD purchases, NFC, elaboration, and message credibility predict consumers' engagement with social media posts related to agricultural hemp and CBD.

Methods

Quantitative methods were used fulfill the purpose of this study and an online survey was distributed in February 2022. The survey was distributed to an opt-in, non-probability sample of Nebraska residents via the survey company Qualtrics, and respondents had to indicate they lived in the state of Nebraska to start the survey. In order to increase the generalizability of the

findings, quotas for race, ethnicity, and gender were used to ensure the sample demographics reflected the 2021 Nebraska Census demographics. An additional quota was used to limit the number of responses from Douglas County and Lancaster County to 46% of the sample, which is also reflective of the state’s population distribution, thus ensuring both rural and urban responses were included in this sample. There were a total of 367 ($n = 367$) complete and useable responses in this study. A full description of sample demographics can be found in Table 1.

Table 1
Respondent Demographics

Demographic	%
Gender	
Female	51.8
Male	48.2
Race	
White	85.6
Hispanic, Latino, or Spanish origin	9.0
Black or African American	6.5
Asian	1.9
American Indian or Alaska Native	2.2
Native Hawaiian or Other Pacific Islander	0.3
Political Ideology	
Very Liberal	9.3
Liberal	22.6
Moderate	39.8
Conservative	16.9
Very Conservative	11.4
Highest Level of Completed Education	
High School (or GED) or less	25.6
2-year College Degree/Some College	33.5
4-year College Degree	24.8
Graduate/Professional Degree	16.1
Total Household Income Before Taxes	
Less than \$25,000	18.8
\$25,000 - \$49,999	28.3
\$50,000 - \$99,999	29.2
\$100,000 - \$149,999	14.2
\$150,000 or more	9.6

Seven questions were analyzed for this study and came from a larger survey instrument. An experimental design was developed to test the effects of message (mis)information on consumers’ intent to engage with social media misinformation. The treatment in this study included three different messages: (1) neutral information (control), (2) positive misinformation, and (3) negative misinformation. These misinformation messages represented common claims related to CBD and hemp (Young, 2019; Kruger et al., 2020) and were reviewed by a panel with expertise in message testing, agricultural hemp, and agricultural communications. The messages were presented as a narration over a 60 second video with the same images and narrator used for

each video. Before seeing the video, respondents were shown the following text, “On the next page, you will see a short video. Please imagine this is a video you might see on Facebook or other social media sites.” The script for each message is below and key changes in the misinformation messages have been bolded.

Neutral Information:

In 2019, Nebraska made the decision to legalize the production of hemp, and farmers across the state can now apply for licenses to grow the crop. Despite some financial risk, hemp production offers financial opportunities in rural areas of the state as a high-value specialty crop. Additionally, increased hemp production and processing can lead to new job opportunities across Nebraska. Hemp contains less than 0.3% THC, which is the psychotropic property found in marijuana. However, hemp can be grown for CBD, which can be used in a variety of products including oils, skincare, and supplements. CBD is often used to address anxiety or insomnia, and research has indicated it may also be beneficial in alleviating chronic pain and treating seizure disorders. CBD remains an unregulated supplement, but it may be beneficial to take in consultation with your doctor.

Negative Misinformation:

In 2019, Nebraska **made the dangerous decision to legalize** the production of hemp, and farmers across the state can now apply for licenses to grow the crop. Hemp production has a **high financial risk and could be detrimental to rural communities**. Additionally, increased hemp production and processing **could cause people to lose their jobs if they show up to work with a “high” after using the product**. Hemp **contains THC**, which is the psychotropic property found in marijuana, **essentially making them the same plants**. Hemp is also grown for CBD, which can be used in a variety of products including oils, skincare, and supplements. Supporters claim CBD can alleviate anxiety or insomnia, but **limited research has been done on the effects of CBD due its Schedule 1 Narcotic classification**. CBD is a **dangerous supplement**, and it would be beneficial for you **to avoid it at all costs**.

Positive Misinformation:

In 2019, Nebraska **made the prosperous decision to legalize** the production of hemp, and farmers across the state can now apply for licenses to grow the crop. Hemp production will **reinvigorate rural economies** in the state as a high-value specialty crop. Additionally, increased hemp production and processing **will lead to the creation of thousands of jobs** across Nebraska. Hemp **does not contain THC**, which is the psychotropic property found in marijuana, **making them completely different plants**. However, hemp can be grown for CBD, which can be used in a variety of products including oils, skincare, and supplements. CBD **can cure** anxiety or insomnia, and **researchers have found it to be a successful treatment** for chronic pain and seizure disorders. CBD is a **100% safe supplement**, and it would be **beneficial for you to start taking it today**.

Respondents were randomly assigned to one of the three message groups, with approximately equal distribution across the groups. A timer was used in Qualtrics that would not allow respondents to skip to the next question until 60 seconds had passed. Additional confirmation checks were added for respondents to confirm the sound on their video worked and they could correctly identify the subject of the video (hemp). Respondents who did not pass the confirmation checks were eliminated from the study. Additionally, respondents exposed to the misinformation messages were provided with a debrief at the end of the survey which informed them of the deception in the study related to the video and provided accurate information about agricultural hemp. Once terminated, incomplete, and outlier responses were removed, there were 127 respondents in the neutral group, 109 in the negative group and 131 in the positive group.

The following survey questions were analyzed for this study: NFC, knowledge of hemp, prior CBD purchases, message elaboration, message credibility, and intended social media engagement. NFC was measured on a 6-item, 5-point Likert-scale with the following labels: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Statements in the scale included “I would prefer complex to simple problems” and “I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought” (Lins de Holanda Coelho et al., 2018). The original reliability of the scale was not acceptable (Cronbach’s $\alpha = .64$), but the removal of two items increased the reliability to a Cronbach’s α of .76, which is considered reliable (Field, 2013). The knowledge of hemp production question was presented to respondents before the treatment and measured with 15 true/false questions (Colclasure et al., 2021) that also offered a “Do Not Know” option. Questions centered around hemp cultivation, the differences between hemp and marijuana, and hemp regulation. The construct was recoded as a dichotomous variable where the correct answer was coded as *one* and incorrect or “Don’t Know” responses were coded as *zero*. Correct responses were added together to create the scale, which was reliable (KR20 of .72; Kuder & Richardson, 1937). CBD purchases was measured with a 6-item, check-all-that-applied question that asked respondents to select which common CBD products they had purchased in past 6 months. The number of products purchased was added together to create the scale for CBD purchases.

Message elaboration, message credibility, and social media engagement questions were shown to respondents immediately after viewing the videos. Elaboration was measured with a 12-item, 5-point Likert-type scale with the same labels as NFC (Reynolds, 1997). Items included statements like, “While viewing the video, I was...” “Not very attentive to the ideas” and “Extending a good deal of mental effort.” Items were recoded so that five indicated high elaboration and a one indicated low elaboration, but the original reliability was low (Cronbach’s $\alpha = .67$). Five of the 12 items were removed, and the reliability increases to .81; the construct was created by taking the average of the remaining seven items. Message credibility was also measured with the same 5-point Likert-type scale with four items that included statements like “The provided information was believable,” and “The provided information was not biased.” This scale was adapted from König and Jucks (2019) and was reliable (Cronbach’s $\alpha = .90$). The average of the items was used to create the scale. The final variable of interest was social media engagement, and respondents were asked to “indicate which of the following actions you would take after watching the previous video on Facebook” and were given a check-all-that-applied list of difference types of engagement (e.g. react, comment, share). This scale was transformed into a

count variable for the number of interactions respondents would engage in after seeing the video. Respondents who selected they would “React” to the video were shown a follow-up question asking for what reaction they would select – like, love, wow, care, angry, or sad.

Prior to distributing the survey to respondents, a panel of experts with knowledge in hemp cultivation, message testing, and videography reviewed the survey to account for face validity. Additionally, the instrument was piloted at Doane University in Crete, Nebraska, and no initial concerns were identified with reliability of scales or the flow of the instrument. Once data were collected, they were imported in SPSS Statistics for analysis. The findings reported for this study come from a larger research project, and some of the findings are based on data reported in prior presentations (Ruth et al., 2022; Ruth et al., 2023).

Simple descriptive statistics, including means, standard deviations, and frequencies, were used to fulfill objectives one and two. One-way ANOVAs were used for objective 3, and Gabriel’s procedures were used for the follow-up *post-hoc* tests due to the uneven group sizes (Field, 2013). Assumptions for normality were not initially met, and the social media engagement variable had a kurtosis greater than two. Removal of two outliers addressed this issue, and then all variables of interest had a skewness and kurtosis within ± 2 (Field, 2013). A multiple linear regression was used for objective four, with social media engagement as the dependent variable, and message group, NFC, knowledge, CBD purchases, elaboration, and message credibility as predictor variables. The message groups were recoded into three dummy variables where a $1 =$ exposed to message and $0 =$ not exposed to message. The neutral information message group was omitted from the model to treat as the control. Multicollinearity diagnostics were run, and no issues were identified – tolerance and variance inflation factors (VIF) fell within acceptable thresholds (Bowerman & O’Connell, 1990, Field, 2013; Menard, 1995). Therefore all assumptions were met for multiple linear regression.

Findings

Objective 1

Respondents’ NFC ranged from 1 to 5 with a mean of 3.39 ($SD = 0.64$), indicating respondents neither agreed nor disagreed they possessed high levels of NFC. When asked knowledge questions related to hemp production, respondents answered between 0 and 15 questions correctly with an overall average of 7.68 correct ($SD = 3.17$). Additionally, respondents reported having purchased between 0 and 5 of the provided list of CBD products in the past 6 months, but the average number of CBD products purchases/used was 1.12 ($SD = 1.18$).

The largest percent of respondents reported having not purchased CBD products in the past six months (42.2%) followed by purchasing CBD oils (37.1%) and CBD consumables (34.1%). Only 20.4% of respondents reported purchasing CBD pet products, 17.6% reported purchasing makeup or cosmetic products containing CBD, and 1.9% reported purchasing “other” CBD products.

Objective 2

Respondents neither agreed nor disagreed they were elaborating on the message when presented with the neutral ($M = 3.34$), negative ($M = 3.43$), or positive ($M = 3.32$) (mis)information (Table 2). However, they did agree the neutral ($M = 3.97$) and positive ($M = 3.89$) (mis)information messages were credible but neither agreed nor disagreed on the credibility of the negative misinformation message ($M = 2.96$). When respondents were asked how they would respond to the video if they had seen it in their Facebook feed, ones exposed to the neutral and positive (mis)information indicated they would participate in more than one type of engagement ($M = 1.32$ and $M = 1.30$) respectively while those exposed to negative misinformation selected an average of 0.87 types of engagements.

Table 2

Elaboration, Message Credibility, and Intent for Online Engagement Across Message Groups

	<u>Total</u>	<u>Message Type</u>		
	<i>M(SD)</i>	Neutral <i>M (SD)</i>	Negative <i>M (SD)</i>	Positive <i>M (SD)</i>
Elaboration ¹	3.36 (0.78)	3.34 (0.80)	3.43 (0.77)	3.32 (0.77)
Message Credibility ¹	3.64 (.98)	3.97 (0.71)	2.96 (1.16)	3.89 (0.73)
Social Media Engagement ²	1.18 (1.38)	1.32 (1.57)	0.87 (1.06)	1.30(1.39)

¹Elaboration and message credibility ranged from 1 to 5

²Social media engagement was a count variable that ranged from 0 to 6

How respondents would engage with presented social media (mis)information is reported in greater detail in Tables 3 and 4. Across all message groups, at least half of the respondents reported they would engage with the post in some capacity (Table 5). The most common types of engagement included reaction, comments, and sharing to personal Facebook pages. However, there were some differences noted across groups. Respondents exposed to the negative misinformation were more frequently reporting they would not engage (49.6%) compared to the neutral (39.4%) and positive (37.4%) message groups. This lack of engagement from the negative misinformation group can be seen across all types of engagement except for commenting, which had a similar rate of response between the negative (23.9%) and positive (24.4) misinformation groups.

Table 3
Intent for Social Engagement Across Message Groups

	<u>Message Type</u>		
	Neutral (<i>n</i> = 127) %	Negative (<i>n</i> = 109) %	Positive (<i>n</i> = 131) %
Would Not Interact	39.4	49.6	37.4
Facebook Reaction	32.3	24.8	35.1
Comment	29.1	23.9	24.4
Share to Page	22.0	13.8	22.1
Share Through Messenger	17.3	8.3	18.3
Tag a Friend	15.7	11.0	18.3
Share Through Text	15.7	5.5	11.5

Respondents who reported they would click a Facebook reaction were asked a follow-up question about what type of reaction they would select (Table 4). The largest percentage of respondents across the three message groups indicated they would “like” the post. However, 43.5% of respondents in the positive misinformation group said they would “love” the post compared to 31.7% in the neutral information group and only 11.1% in the negative (mis)information group. Additionally, only the respondents exposed to the negative misinformation groups said they would select “sad” (11.1%) or “angry” (18.5%) reactions.

Table 4
Facebook Reactions Across Message Groups

	<u>Message Type</u>		
	Neutral (<i>n</i> = 41) %	Negative (<i>n</i> = 27) %	Positive (<i>n</i> = 46) %
Like	43.9	25.9	45.7
Love	31.7	11.1	43.5
Care	7.3	14.8	4.3
Wow	17.1	18.5	6.5
Sad	0.0	11.1	0.0
Angry	0.0	18.5	0.0

Objective 3

An ANOVA revealed there was no statistically significant difference in elaboration across message groups ($F(2,364) = .64, p = .52$). However, there were statistically significant differences in message credibility ($F(2,364) = 47.30, p < .01$) and online engagement ($F(2,364) = 3.95, p = .20$) across message groups. Follow-up tests are reported in Tables 5 and 6. Respondents perceived the negative misinformation message to be less credible compared to the positive misinformation message and the neutral information message (Table 5). Additionally, the respondents exposed to the negative misinformation intended to engage with the post less than those exposed to the neutral message (Table 6). No other differences were identified between the message groups.

Table 5*Follow-up Gabriel's Procedures between Groups for Message Credibility*

J	I	Mean Diff (J-I)	SE	p-value
<u>Neutral</u>	Negative	1.01	.11	.00**
	Positive	.08	.11	.86
<u>Negative</u>	Neutral	-1.01	.11	.00**
	Positive	-.93	.11	.00**

** $p < .01$ **Table 6***Follow-up Gabriel's Procedures between Groups for Intent for Social Media Engagement*

J	I	Mean Diff (J-I)	SE	p-value
<u>Neutral</u>	Negative	.45	.18	.04*
	Positive	.03	.17	.99
<u>Negative</u>	Neutral	-.45	.18	.04*
	Positive	-.42	.18	.05

* $p < .05$ **Objective 4**

The regression model to predict intent to engage with social media (mis)information was statistically significant ($F(7,359) = 30.52, p < .01$) and could account for approximately 37% of the variance in intent to engage with social media ($R^2 = .37$; Table 7). When accounting for the other variables of interest, exposure to misinformation did not predict engagement. However, both perceived message credibility ($b = .30, p < .01$) and CBD purchases ($b = .63, p < .01$) were positive predictors of engagement.

Table 7*Regression Model to Predict Intent to Engage with Social Media*

Predictor Variable	B (coefficient)	SE _B	β	t	p
Constant	-.44	.46		-0.94	.34
Message					
Negative	-.11	.16	-.04	-0.69	.49
Positive	.07	.14	.03	0.52	.60
CBD Purchases	.63	.05	.54	11.84	.00**
Message Credibility	.30	.07	.21	4.27	.00**
NFC	-.08	.10	-.04	-.088	.38
Elaboration	.06	.08	.04	0.82	.42
Knowledge of Hemp	-.01	.02	-.02	-0.56	.58

** $p < .01$ **Discussion, Implications, and Recommendations**

The purpose of this study was to explore how consumers engage with (mis)information related to agricultural hemp and CBD. This study was guided by the ELM (Petty & Cacioppo, 1986) and

conceptualized motivation to process information as NFC and past CBD purchases (personal relevancy) and measured to hemp knowledge to understand respondents' ability to process the information (Petty & Cacioppo, 1986). Overall, respondents' NFC was neutral and did not skew one way or another. Additionally, respondents had purchased approximately one CBD product on average in the past six months and more than 40% reported having not purchased CBD products previously. This low level of personal relevancy and neutral NFC would indicate the respondents would not be highly motivated to critically assess agricultural hemp (mis)information. The findings also demonstrated large gaps in knowledge, similar to past research (Colclasure et al., 2021; Rampold et al., 2021). This lack of knowledge would also decrease respondents' ability to process the message and engage in elaboration – they would most likely process the information using the peripheral processing route (Petty & Cacioppo, 1986).

Respondents reported not engaging in high levels of elaboration after being exposed to a hemp and CBD (mis)information message, which further supports the conclusions from past research that consumers used the peripheral processing route when exposed to agricultural messages (Frewer et al., 1997; Goodwin, 2013; Meyers, 2008; Ruth & Rumble, 2017). The peripheral cue in this study was message credibility, and the negative misinformation message was found to be less credible compared to the positive misinformation message or the neutral information message. Consumers would be less likely to believe that type of misinformation compared to other types of (mis)information and less likely to adopt the position of the message (Gazziano, 1988). It is also important to note that the perceived credibility of the positive misinformation was indistinguishable from the perceived credibility of the neutral information. Prior research has identified the majority of CBD claims online appear to overstate the product's health benefits (Merten et al., 2020; Soleymanpour, et al., 2022; Zenone et al., 2020). However, it is challenging to conclude whether exposure to these statements has influenced the respondents' perceived credibility of positive misinformation or if consumers are simply more likely to accept positive statements as true. Follow-up interviews would be an important avenue for future research to better understand how consumers make credibility judgements when exposed to (mis)information.

Intent to engage with the social media (mis)information was not particularly high across the three message groups, which is to be expected if individuals are using the peripheral processing route (Petty & Cacioppo, 1986). However, intent to engage was less in the negative misinformation group, which aligns with the findings that this message was also not viewed as credible as the other two messages (Gazziano, 1988). When examining social media engagement more closely, if respondents did interact with the post, it was most commonly a Facebook reaction, comment, or share to page. Further exploration of the reactions showed that only the negative misinformation message elicited sad and angry reactions. Future research should examine this finding in greater detail to understand if these reactions were in response to believing the negative misinformation or due to respondents being sad/angry about the inaccuracy of the misinformation presented. Regardless of the motivation, this type of engagement would still likely lead to increased spread of misinformation online though (Barnhart, 2019).

The regression model could account for a large amount of the variance in intent to engage with social media (mis)information (Cohen, 1988). Interestingly though, exposure to negative or

positive misinformation did not affect intent to engage when accounting for the ELM variables. The only predictors were past CBD purchases and message credibility. Despite the messages being personally relevant to more than half of the respondents, their lack of knowledge likely caused them to rely on peripheral cues, like message credibility, to form attitudes and guide behaviors. This regression further supports the conclusion that the peripheral pathway was used to evaluate hemp (mis)information. However, replicating this research on a national scale or with other misunderstood topics in agriculture could help to better validate these findings

If consumers are evaluating online hemp information based on peripheral cues alone, they will likely be more susceptible to believing and sharing misinformation. Within the context of agricultural hemp and CBD, respondents may not have believed negative misinformation, but they viewed messages sharing neutral information and positive misinformation to be equally credible. This belief in positive misinformation could contribute to growing science literacy concerns and make consumers susceptible to misinformation that overstates or overpromises science and health impacts. Practitioners should keep these findings in mind, and when trying to combat online misinformation, efforts may be better placed in trying to correct positive misinformation shared about hemp and CBD compared to negative misinformation. Agricultural communicators and Extension agents can also work with hemp producers to offer consumers opportunities to both try and learn about CBD products to increase personal relevancy of the communication and promote central processing. Additionally, agricultural educators could partner with hemp producers and researchers to develop curricula to increase hemp knowledge. Partnerships between agricultural communicators and agricultural educators will also be vital to slowing the spread of online misinformation through the development of secondary and post-secondary education curricula focused on assessing and evaluating agricultural science information in the media, regardless of the context.

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Identifying the Perceptions, Barriers, and Implementation of Middle School Supervised Agricultural Experiences

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Although School based agricultural education (SBAE) teachers have a variety of responsibilities within a comprehensive program, supervised agricultural experience (SAE) programs are considered an intracurricular component. Unfortunately, the ability for teachers to plan for and facilitate SAEs has been reported as lacking. The purpose of this study was to identify the current perceptions, barriers, and implementation of current middle school SAEs in the Southeast United States, which was carried out by a modified Delphi approach to reach consensus on the perceptions, barriers, and implementation of middle school SAEs from a panel of experts. After three rounds, 18 items achieved consensus related to perceptions of Middle School SAE integration, 19 items outlining barriers for Middle School SAE implementation, and 22 items indicating best practices for Middle School SAE integration. When we consider the uniqueness of middle school SBAE programs, the overall list of perceptions, barriers, and best practices is of great value for future implementation as additional programs are added. Recommendations for practice begin with purposeful professional development opportunities specific for middle school SBAE teachers.

Introduction

Students receive experiential learning through supervised agricultural experience (SAE) to develop industry and career-based competencies (National Council for Agricultural Education [NCAE], 2012). Although School based agricultural education (SBAE) teachers have a variety of responsibilities within a comprehensive program, SAE programs are considered an intracurricular component (NCAE, 2012). SAE programs have been an integral component of SBAE for over a century (Rubenstein et al., 2014), most notably demonstrating an increase in the employability skills of students (Ramsey & Edwards, 2012; Thiel & Marx, 2019). To facilitate the SAE component, SBAE teachers often employ experiential learning as the pedagogical approach to instruction (Baker et al., 2012). Unfortunately, the ability for teachers to plan for and facilitate such experiences has been reported as lacking (Hanna, 1992). Furthermore, when we consider middle school SBAE programs, the ability to offer a comprehensive program is vastly different than that of a high school program (Talbert et al., 2013).

As a part of middle school Career and Technical Education (CTE), SBAE provides opportunities for skill development and career exploration (Ireland, 2022). Nationwide, many middle school CTE programs have integrated science, technology, engineering, and math (STEM) to engage students (Godbey & Gordon, 2019). Middle school has also become a preparation point for careers and high school success, of which attendance, grades, and engagement become predictors of high school completion (Balfanze, 2009; Godbey & Gordon, 2019; Hoff et al., 2015). As states utilize Perkins V funds to expand CTE programs, number of middle grades SBAE programs will only increase (Hanover Research, 2020).

The National Council for Agricultural Education's summit began a process of reinvigorating SAE by identifying the driving forces behind high-quality experiential work and projects based on a trend of decreasing numbers of students engaged through various measurable outcomes (NCAE, 2012). An outcome of the summit was a national committee charged with focusing the profession's commitment to SAE. This work led to a renewed philosophy and guiding principles of SAE to address barriers and created a goal of 100% SAE participation. Curriculum, resources, and learning guides were developed for secondary agricultural teachers but failed to address unique needs of middle school programs (NCAE, 2012). If SAE projects are intended for every student enrolled in SBAE, including those in middle school, and if middle schools are considered a preparatory vehicle for high school success and future careers, then SAE within middle school SBAE warrants further research and discussion among the profession.

Theoretical/Conceptual Framework

Research in the field of education for several decades has been based on theories more commonly used in economic fields to justify expenses (Holden & Biddle, 2017). During the later 1950's human capital began to be used as an academic program to support public spending in education as a form of investment (Ross, 2021). The idea was that public investment in education provided a high rate of return on spending and the accomplishment of shared goals, such as faster economic growth and poverty reduction (Holden & Biddle, 2017). As a public investment, investing in education improves economic growth through higher productivity, which is achieved through individual social stability and healthier lifestyles (Maringe, 2015). Today policymakers globally generally accept the premise that investment in education is a good thing as a means to provide economic growth and national prosperity (Carneiro et al., 2010).

While government leaders and policymakers focus on the overall growth and welfare of the nation, outputs are often measured, such as increased lifetime earnings, access to higher-income careers, reduced unemployment, and increased career growth (Maringe, 2015). From the employer's perspective, human capital is a renewable resource (Ross, 2021), as they cultivate productivity as a potential source of innovation and creativity. In CTE, human capital states that an individual will obtain training “when the present discounted value of the benefits of training exceeds the cost of the training” (McCall et al., 2016, p. 479). An individual is more likely to invest in training if the returns or increased earnings are more significant than the training.

In the U.S. agricultural industry, employment fell in the proportion of total employment from 33% in 1910 to roughly 2% in 2017 (Wang et al., 2017). During this same period, total farm output tripled, and total labor use declined nearly 80 percent, implying that output per worker grew (Wang et al., 2017). The educational attainment of farmworkers and operators has changed dramatically, as nearly three-quarters of farm workers in 1950 received less than nine years of education, compared to only 17% in 2017. In comparison, in 1950, only 4% of farm workers and operators completed some college, compared to nearly 40% in 2017 (Wang et al., 2017). At the intersection of education, agriculture, and industry needs, SBAE must capitalize on extensions of the human capital theory to conceptualize the work performed in SAE in the middle grade levels that can be measured and understood. As human capital focuses on the education, skills, training, and experiences essential for a chosen career (Little, 2003; Schultz, 1971), the need to consider the perceptions, barriers, and implementation of SAE at the middle school level is essential.

Purpose of the Study

The purpose of this study was to identify the current perceptions, barriers, and implementation of current middle school SAEs in the Southeast United States (i.e., North Carolina, South Carolina, Georgia, Alabama, and Florida). Three research objectives guided this study:

1. Determine the perceptions of integrating SAE into middle school SBAE programs,
2. Identify current barriers of middle school SAE integration for all students, and
3. Establish best practices for middle school SAE implementation.

Methods and Procedures

This study employed a modified Delphi approach to reach consensus on the perceptions, barriers, and implementation of middle school SAEs from a panel of experts (Dalkey, 1969). Specifically, the panel of experts consisted of in-service middle school SBAE teachers in North Carolina, South Carolina, Georgia, Alabama, and Florida. Determining the proper panel of experts can be challenging, but is essential for a successful Delphi (Dalkey, 1969). This panel was deemed experts as they have been considered to have the necessary skill set and work experience (Benner, 1982) as current middle school SBAE teachers. Furthermore, this selection aligns with the human capital theory grounding this study, as these experts were hired as competent middle school SBAE teachers by school districts, indicating they have the necessary human capital to be effective in their chosen career, allowing the research team to deem them experts.

Qualtrics, an online data survey data collection tool, was used for all three rounds. The recommendations of Dillman et al. (2014) were followed to ensure compatibility of each round. Additionally, each round was evaluated for face and content validity by a panel of agricultural education teacher preparation faculty with an excess of 30 years of experience between the middle school, secondary, and post-secondary levels. The Qualtrics link was distributed to a researcher developed distribution frame which included all current middle school SBAE teachers in North Carolina, South Carolina, Georgia, Alabama, and Florida ($N = 401$). To ensure reliability of data collection, the researchers worked to minimize attrition between rounds, maintaining integrity. This process aligns with Dalkey (1969) who stated the ability to maintain a reliability of .80 or greater when a Delphi has more than 13 respondents in each round. The expert panel ($n = 34$) spanned five states, was 70% female, ranged in age from 21 to 55, and included first year teachers to those with over 25 years of experience. The experts were primarily traditionally certified (70%) with programs ranging from 50 students to over 350 students.

For Round One, the researchers asked three open-ended questions, *What is your perception of integration SAE into your middle school agricultural education program?*; *What are the barriers for integrating SAE into your middle school agricultural education program?*; and *What are the best practices for integrating SAEs into middle school agricultural education programs?* In addition to the three overarching questions, personal and professional characteristic questions were asked. The items from each of the three questions were analyzed by the research team using the constant comparative method (Glaser & Strauss, 1967) to reduce statements that were duplicative to be distributed to the experts in Round Two. Using this method allowed the

researchers to group similar items while focusing on the expert’s voice (Glaser & Strauss, 1967). To ensure inter-rater reliability throughout this process, the research team collectively analyzed the statements (Privitera, 2017). Round Two asked the experts to rate each item on a four-point scale of agreement (1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Agree). An a priori consensus rating was established for Round Two, therefore, if an item achieved a mean of 3.0 or higher with 100% agreement from the experts, the item was retained for the final list.

Any items not reaching consensus in Round Two were redistributed in Round Three, asking experts to *agree* or *disagree*. Any item an expert disagreed with prompted a request for an explanation on why they disagreed. Round Three ultimately provides experts a final opportunity to reflect and provide clarification for any of the remaining items (Hsu & Sanford, 2007). Final consensus of remaining items was set at an 85% a priori level of agreement, meaning 85% of the experts *agreed* with the item in Round Three. The three procedural rounds within this Delphi study were appropriate and typical to achieve consensus (Custer et al., 1999).

Findings

Round One aimed to compile a comprehensive list of items from the three open-ended questions. Round One result in responses from 34 experts. Minimal attrition occurred between Round One and Round Two, as Round Two resulted in responses from 33 of the 34 experts. Any items not reaching consensus in Round Two were redistributed to the experts in Round Three. Twenty-eight experts responded in Round Three, resulting in some attrition between Rounds Two and Three, but not enough to impact reliability concerns within the expert panel (Dalkey, 1969).

Research Objective 1: Determine the perceptions of integrating SAE into middle school SBAE programs

Round One by elicited responses to one overarching question, *What is your perception integration SAE into your middle school agricultural education program?* Round One resulted in 30 statements which included a variety of detailed statements. The 30 initial statements were compiled to develop a comprehensive list of 18 items that were distributed in Round Two. Round Two asked experts to rate each item on a four-point scale of agreement. Table 1 outlines the mean, standard deviation, and percentage of agreement for each of the 18 items.

Table 1

Round Two: Level of Agreement for Perceptions of Middle School SAE Integration (n = 33)

Identified Item	<i>M</i>	<i>SD</i>	<i>%Agreement^a</i>
Supporting the three-component model.	3.70	.47	100
Providing personal growth opportunities for students.	3.69	.47	97.0
Teaches responsibility.	3.65	.49	97.0
Developing real life experiences for students.	3.59	.57	97.0
Providing hands-on experiences for students.	3.56	.51	100
Teaching students to maintain records.	3.52	.58	97.0
Helping students set goals.	3.48	.58	97.0

Building on classroom content knowledge.	3.44	.58	97.0
Building a foundation for high school involvement.	3.41	.64	93.9
Stimulating student interest in agriculture.	3.37	.57	90.9
Presenting agricultural opportunities for students.	3.37	.57	90.9
Getting students involved.	3.33	.48	100
Promoting program success.	3.33	.56	90.9
Developing career experiences for students.	3.32	.63	87.9
Aligning with content standards.	3.15	.72	84.8
Teaching Science.	3.15	.77	81.8
Providing opportunities for FFA advancement, degrees, and awards.	3.15	.72	84.8
Teaching the scientific method.	2.89	.70	75.6

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; ^a = items marked as either a 3 or a 4.

Items achieving a mean score of 3.0 or higher and 100% agreement amongst the panelist were determined to meet consensus in Round Two. Of which, three items achieved consensus, *Supporting the three-component model*, *Providing hands-on experiences for students*, and *Getting students involved*. The remaining 15 items were redistributed in Round Three, all of which reached consensus, achieving a percentage agreement at 89.2% or above (see Table 2).

Table 2

Round Three: Level of Agreement for Perceptions of Middle School SAE Integration (n = 28)

Identified Item	<i>Agree</i>	<i>Disagree</i>	<i>%Agreement^a</i>
Developing real life experiences for students.	28	0	100
Building on classroom content knowledge.	28	0	100
Providing personal growth opportunities for students.	27	1	96.4
Teaches responsibility.	27	1	96.4
Teaching students to maintain records.	27	1	96.4
Helping students set goals.	27	1	96.4
Stimulating student interest in agriculture.	27	1	96.4
Presenting agricultural opportunities for students.	27	1	96.4
Developing career experiences for students.	27	1	96.4
Aligning with content standards.	27	1	96.4
Teaching Science.	27	1	96.4
Providing opportunities for FFA advancement, degrees, and awards.	26	2	92.8
Teaching the scientific method.	26	2	92.8
Building a foundation for high school involvement.	25	3	89.2
Promoting program success.	25	3	89.2

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

Research Objective 2: Identify current barriers of middle school SAE integration for all students

The second research objective aimed to answer one overarching question, *What are the barriers for integrating SAE into your middle school agricultural education program?* Round One resulted in 68 statements. Thirty-Seven statements were distributed in Round Two after the research team analyzed the statements from Round One. Round Two asked experts to rate each item on a four-point scale of agreement. Table 3 outlines the mean, standard deviation, and percentage of agreement for each of the 37 items.

Table 3

Round Two: Level of Agreement for Barriers of Middle School SAE Integration (n = 33)

Identified Item	<i>M</i>	<i>SD</i>	<i>%Agreement^a</i>
Teaching in a single teacher program.	3.50	.76	93.9
Overwhelming teacher responsibility.	3.46	.65	93.9
Student transportation.	3.38	.75	87.9
Competition for student time.	3.27	.72	87.9
Student financial limitations.	3.23	.65	90.9
A lack of student motivation.	3.23	.65	90.9
Limited accessibility to production agriculture.	3.19	.63	90.9
Student maturity.	3.19	.63	90.9
Student living situations.	3.19	.75	84.8
Agriculture being an elective course.	3.19	.69	87.9
Student SAE knowledge.	3.12	.53	93.9
Student apathy.	3.12	.67	87.9
Student lack of planning.	3.08	.64	42.4
Teacher stress.	3.08	.74	81.8
Students' willingness to accept responsibility.	3.04	.77	78.8
A lack of resources.	3.00	.69	87.9
Teaching in a Title I or low economic school.	2.96	.82	78.8
A lack of student buy-in.	2.96	.77	75.8
School schedules (9-week vs. semester vs. year-long).	2.92	.85	69.7
Limited age-appropriate resources.	2.92	.69	78.8
Program funding.	2.92	.80	72.7
A lack of student interest in agriculture.	2.88	.77	72.7
A lack of family support.	2.85	.61	78.8
Class size.	2.85	.97	69.7
A limited scope of SAE options (i.e., SAE = Livestock).	2.73	.96	63.6
A lack of teacher knowledge related to SAE.	2.69	1.0	69.7
Being a new teacher.	2.65	.98	69.7
A lack of necessary student skills.	2.65	.75	66.7
A lack of class time to spend on SAE.	2.62	.70	66.7
Limited SAE project options.	2.62	.75	63.6

Teaching in urban schools.	2.58	.90	63.6
Being a new Middle School Agriculture program.	2.58	.95	66.7
Language barriers.	2.50	.91	51.5
A lack of administrative support.	2.36	.95	57.6
A lack of alignment to Industry Certifications.	2.27	.83	42.4
SAE not being tied to curriculum.	2.23	.86	48.5
Child labor laws.	2.12	.82	39.4

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; ^a = items marked as either a 3 or a 4.

No items related to barriers of middle school SAE implementation met consensus in Round Two (i.e., achieved a mean score of 3.0 or higher and 100%), therefore, 37 items were redistributed in Round Three. Table 4 identifies the items for which experts were asked to agree or disagree. Of those, 19 items reached consensus, achieving an 85% or higher level of agreement.

Table 4

Round Three: Level of Agreement for Barriers of Middle School SAE Integration (n = 28)

Identified Item	<i>Agree</i>	<i>Disagree</i>	<i>%Agreement^a</i>
A lack of student motivation.	28	0	100
Student transportation.	27	1	96.4
Student financial limitations.	27	1	96.4
Student maturity.	27	1	96.4
Student lack of planning.	27	1	96.4
Overwhelming teacher responsibility.	26	2	92.8
Competition for student time.	26	2	92.8
Student living situations.	26	2	92.8
Agriculture being an elective course.	26	2	92.8
Teacher stress.	26	2	92.8
Students' willingness to accept responsibility.	26	2	92.8
Teaching in a single teacher program.	25	3	89.2
Student apathy.	25	3	89.2
A lack of resources.	25	3	89.2
Student SAE knowledge.	24	4	85.7
Program funding.	24	4	85.7
A lack of family support.	24	4	85.7
A lack of necessary student skills.	24	4	85.7
A lack of class time to spend on SAE.	24	4	85.7
Teaching in a Title I or low economic school.	23	5	82.1
A lack of student interest in agriculture.	23	5	82.1
A lack of student buy-in.	22	6	78.6
Limited age-appropriate resources.	22	6	78.6
Language barriers.	22	6	78.6
Limited accessibility to production agriculture.	21	7	75.0
Class size.	21	7	75.0

Being a new teacher.	21	7	75.0
Limited SAE project options.	21	7	75.0
Being a new Middle School Agriculture program.	21	7	75.0
A lack of administrative support.	21	7	75.0
School schedules (9-week vs. semester vs. year-long).	19	9	67.9
A limited scope of SAE options (i.e., SAE = Livestock).	18	10	64.3
A lack of alignment to Industry Certifications.	18	10	64.3
Child labor laws.	18	10	64.3
A lack of teacher knowledge related to SAE.	17	11	60.7
Teaching in urban schools.	17	11	60.7
SAE not being tied to curriculum.	16	12	57.1

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

When asked to explain why they disagreed with items not reaching consensus, as the collective response indicated that the items were not widespread barriers, with statements such as, “they are not problems where I teach”, “SAE’s are not limited in scope”, “SAE’s do not have to relate to production agriculture”, or “these barriers can be overcome by utilizing available resources”.

Research Objective 3: Establish best practices for middle school SAE implementation

Round One resulted in 62 initial statements, which were reduced to 25 items distributed to the panel of experts in Round Two. Table 5 outlines the mean, standard deviation, and percentage of agreement for each of the 37 items.

Table 5

Round Two: Level of Agreement for Best Practices in Middle School SAE Integration (n = 33)

Identified Item	<i>M</i>	<i>SD</i>	<i>%Agreement</i>
Dedicating class time for SAE implementation.	3.52	.51	100
Aligning your program with the three-component model of agricultural education.	3.46	.71	90.9
Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.).	3.44	.75	87.9
Starting with Foundational SAEs.	3.37	.63	93.9
Teaching students accurate record keeping.	3.33	.62	93.9
Parent/family support.	3.30	.61	93.9
Dedicating class time to teach SAEs.	3.30	.78	90.9
Using SAE to teach soft skills.	3.30	.61	93.9
Community support.	3.26	.65	90.9
Developing student buy-in.	3.26	.59	93.9
Connecting existing student projects to SAE areas.	3.22	.64	90.9
Community service and/or volunteer projects.	3.19	.56	93.9
SAE as part of your class grade.	3.19	.79	87.9
Developing community relevant SAE projects.	3.15	.72	84.8

Establishing support from school administration.	3.15	.82	78.8
Requiring SAE for all students as part of your class.	3.15	.82	84.8
Introducing students to AgExplorer.	3.12	.67	87.9
Weekly project check-ins.	3.04	.66	84.8
Optimizing school-based enterprises.	2.93	.68	78.8
Connecting SAEs to FFA degrees and awards.	2.93	.68	78.8
Implementation of immersive SAEs.	2.89	.70	81.8
Requiring students to invest a set number of hours for SAEs.	2.88	.77	72.7
Connecting SAEs to science fair projects.	2.74	.76	69.7
Creating student vision boards.	2.67	.68	63.6
AET implementation for record keeping.	2.59	.93	60.6

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; ^a = items marked as either a 3 or a 4.

One item (*Dedicating class time for SAE implementation*) met consensus in Round Two, the remaining 24 items were redistributed to the experts for Round Three. Twenty one of the 24 items achieved consensus in Round Three. The items not reaching consensus amongst the experts were removed from the final list (see Table 6).

Table 6

Round Three: Level of Agreement for Best Practices in Middle School SAE Integration (n = 28)

Identified Item	<i>Agree</i>	<i>Disagree</i>	<i>%Agreement</i>
Starting with Foundational SAEs.	28	0	100
Dedicating class time to teach SAEs.	28	0	100
Using SAE to teach soft skills.	28	0	100
Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.).	27	1	96.4
Teaching students accurate record keeping.	27	1	96.4
Developing student buy-in.	27	1	96.4
Connecting existing student projects to SAE areas.	27	1	96.4
SAE as part of your class grade.	27	1	96.4
Developing community relevant SAE projects.	27	1	96.4
Establishing support from school administration.	27	1	96.4
Requiring SAE for all students as part of your class.	27	1	96.4
Community support.	26	2	92.8
Community service and/or volunteer projects.	26	2	92.8
Optimizing school-based enterprises.	26	2	92.8
Aligning your program with the three-component model of agricultural education.	25	3	89.2
Parent/family support.	25	3	89.2
Introducing students to AgExplorer.	25	3	89.2
Connecting SAEs to FFA degrees and awards.	25	3	89.2
Implementation of immersive SAEs.	24	4	85.7

Requiring students to invest a set number of hours for SAEs.	24	4	85.7
Connecting SAEs to science fair projects.	24	4	85.7
Weekly project check-ins.	23	5	82.1
Creating student vision boards.	22	6	78.6
AET implementation for record keeping.	21	7	75.0

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

Experts indicated disagreement with items as they “are not necessary” or “increase the level of stress and anxiety of students”. AET implementation for record keeping resulted in feedback that “other recording keeping resources exist” and “I have had more success with record keeping outside of AET”. Table 7 categorizes the items achieving consensus within the three procedural rounds of the Delphi (Dalkey, 1969).

Table 7

Categorized Items for Middle School SAE Integration

Category	Identified Item
Perceptions	Supporting the three-component model.
	Providing hands-on experiences for students.
	Getting students involved.
	Developing real life experiences for students.
	Building on classroom content knowledge.
	Providing personal growth opportunities for students.
	Teaches responsibility.
	Teaching students to maintain records.
	Helping students set goals.
	Stimulating student interest in agriculture.
	Presenting agricultural opportunities for students.
	Developing career experiences for students.
	Aligning with content standards.
	Teaching Science.
	Providing opportunities for FFA advancement, degrees, and awards.
Teaching the scientific method.	
Building a foundation for high school involvement.	
Promoting program success.	
Barriers	A lack of student motivation.
	Student transportation.
	Student financial limitations.
	Student maturity.
	Student lack of planning.
	Overwhelming teacher responsibility.
	Competition for student time.
Student living situations.	

- Agriculture being an elective course.
- Teacher stress.
- Students' willingness to accept responsibility.
- Teaching in a single teacher program.
- Student apathy.
- A lack of resources.
- Student SAE knowledge.
- Program funding.
- A lack of family support.
- A lack of necessary student skills.
- A lack of class time to spend on SAE.

Best Practices	<ul style="list-style-type: none"> Dedicating class time for SAE implementation. Starting with Foundational SAEs. Dedicating class time to teach SAEs. Using SAE to teach soft skills. Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.). Teaching students accurate record keeping. Developing student buy-in. Connecting existing student projects to SAE areas. SAE as part of your class grade. Developing community relevant SAE projects. Establishing support from school administration. Requiring SAE for all students as part of your class. Community support. Community service and/or volunteer projects. Optimizing school-based enterprises. Aligning your program with the three-component model of agricultural education. Parent/family support. Introducing students to AgExplorer. Connecting SAEs to FFA degrees and awards. Implementation of immersive SAEs. Requiring students to invest a set number of hours for SAEs. Connecting SAEs to science fair projects.
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Conclusions, Implications, and Recommendations

This study aimed to determine the perceptions, barriers, and best practices for integrating SAE into middle school SBAE programs, as identified by an expert panel of Middle School SBAE teachers in North Carolina, South Carolina, Georgia, Alabama, and Florida. After three rounds, 18 items achieved consensus related to perceptions of Middle School SAE integration, 19 items outlining barriers for Middle School SAE implementation, and 22 items indicating best practices for Middle School SAE integration. Overall, middle school SBAE teachers reached consensus on 18 items related to the value or perception of SAE integration. Of which, a positive perception is

held overall with SAE providing a value add to the middle school students. This aligns with previous research identifying SAE as an integral component of SBAE programs (Rubenstein et al., 2014), helping students increase their employability skills and furthering their content knowledge (Ramsey & Edwards, 2012; Thiel & Marx, 2019).

By reviewing the list of barriers, it is apparent that strategies to address SAE in middle school agricultural education courses must address meeting the students where they are in terms of age, maturity, and exposure. Ultimately this connects back to their human capital (i.e., education, skills, training, and experiences) essential for future careers (Little, 2003; Schultz, 1971). Therefore, the development of curriculum and middle school specific implementation strategies for SAE that provide more of an exploratory experience is essential, allowing students to see the potential in the educational investment (Ross, 2021). Furthermore, the human capital of middle school SBAE teachers should be considered, helping to improve economic growth in educational opportunities for middle school students through higher productivity, social stability, and healthier lifestyles for SBAE teachers (Maringe, 2015). This becomes increasingly important as the findings of this study identify middle school teachers juggling as many if not more aspects of the SBAE model as compared to their high school counterparts, in addition to working with substantially more students, as over 60% of the respondent's more than 100 students in single teacher programs. Perhaps it is time to consider a middle school specific SAE for all.

With 22 items focusing on SAE best practices, it is apparent that middle school SBAE teachers implement SAE on varying levels. This facilitation of SAE speaks to the need for teachers to be prepared to implement experiential learning as the pedagogical approach to instruction (Baker et al., 2012). Unfortunately, consistency of implementation is of concern, which aligns with the previously identified struggles for SBAE teachers to plan and facilitate SAE experiences (Hanna, 1992). When we consider the uniqueness of middle school SBAE programs (Talbert et al., 2013), the overall list of perceptions, barriers, and best practices is of great value for future implementation as additional programs are added (Hanover Research, 2020). To fully encompass the three-component model of agricultural education, particular focus should work to utilize the FFA student organization to enforce SAE achievement for middle school students. This begins with nationally recognized events and awards to further support middle school SBAE programs. Many of the states involved in this study have implemented state level awards and leadership/career development events to recognize middle grades students for their accomplishment, which is evident in the developed best practices.

Recommendations for practice begin with purposeful professional development opportunities specific for middle school SBAE teachers, focusing on the identified perceptions, barriers, and best practices. Professional development should be shared with teacher leaders, educators, state staff, and school administrators, as the identified list is extensive, and everyone has a shared role and vested interest. Potential topics include best management practices and coping strategies to address barriers to SBAE middle grades SAE implementation. Additionally, nationally recognized events and awards are needed to further support middle school SBAE programs. SBAE teacher educators, middle school SBAE teachers, and state staff should work collectively on curriculum or guides for middle grade SAE implementation, as these guides must address varying program sizes and teaching schedules along with the large class sizes. Since this study was limited to five southern states, the replication of this study should be considered in states

with middle school SBAE programs. Additionally, this study should be replicated periodically to assess teacher perceptions, current barriers, and implementation considering the constantly changing educational climate. To further the validity of this list, input from teacher educators, state staff, middle school students, and administrators should be investigated.

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That's Not In My Position Description: A Discourse Analysis of SBAE Migratory Context

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Abstract

While the choice to move to a new school is personal, many play a role in justifying that choice for the mobile teacher. These justifiers—or influencers—make up the socializing network for teachers (in this case, SBAE teachers) in new settings. Our study outlines how mobile SBAE teachers rationalize the choice to change schools and validate career moves. We used a positioning theory approach to discourse to give mobile teachers (teachers who change schools) and influencers a voice. Positioning theory allowed us to situate mobile teachers as they reflected on their choice to change school districts, and influencers as they recounted their interactions with new-to-district SBAE teachers. The purpose of our study was to identify the positionality of mobile SBAE teachers in their school-based context. We did this by examining positionalities of SBAE teachers and influencers in their interactions. We found SBAE teachers aligned with their positioning in the Agricultural Education literature and found additional implications for mobile teachers. The teachers in this study also navigated the expectations set by their predecessor and voiced by their community. Our recommendations focus on SBAE teachers and their job search, workload, responsible autonomy, and replaceability, and influencers' interactions to support these endeavors.

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Introduction

In 2018, a teacher introduced herself to me saying, “I’m a first-year teacher with twenty years of experience.” What she meant, was, “Hi, I’ve recently changed schools, and it’s like starting my career all over again.” This led to several questions, including: why, if changing schools is so hard, would a teacher opt to remain in the teaching profession over moving into industry for a higher paying career? The concept of mobile teachers is something that, until recently, the literature did not attempt to explain. In 2019, we worked with mobile teachers to identify how they defined success through *mobility* (Haddad et al., 2019). *Mobility* is variously defined and operationalized but is generally the process of moving from one school district to another. We found teachers operationalized a successful move as one that provides additional support and reinvigorates their career through a professional challenge (Haddad et al., 2019). This led to several additional questions, but the one guiding this study sought to explore how mobile teachers found support and challenge within their new environments.

Our research explores how the education profession examines the uniqueness of mobile teachers and their needs. This work shifts the paradigm of the professional conversation from current discourses of mobile teachers being leavers, less effective, and lacking commitment to

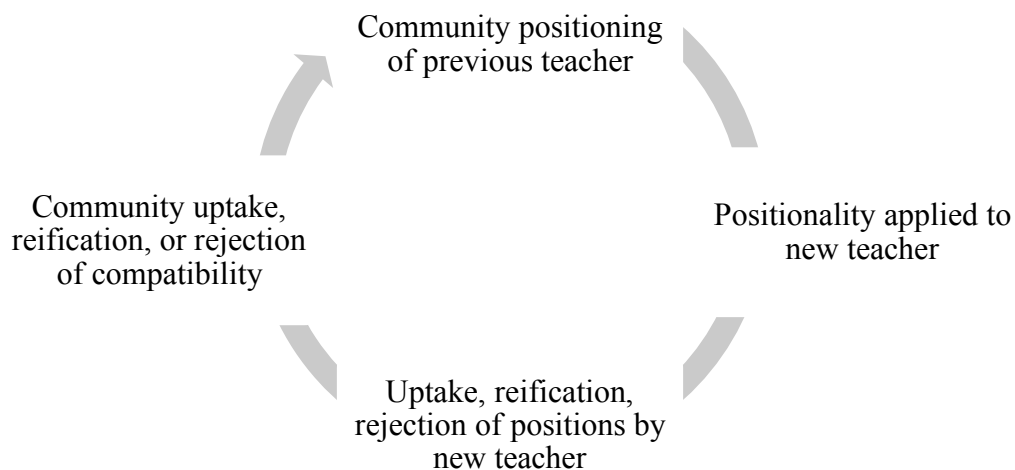
teaching (Atterbury et al., 2017; Feng & Sass, 2012; Gary et al., 2015; Goldring et al., 2014; Ingersoll, 2001; Ronfeldt et al., 2012; Ross, et al., 1999; West & Chingos, 2009). Instead, we step back from simply viewing mobile teachers as problematic and move towards a broader contextualization recognizing the impact of the system in which teachers reside. We assume there is a system, people operate in it, and people seek learning and growth as distinctly hopeful human phenomena. Based on our previous work, we believed a search for relational connection is critical as teachers navigate a teaching career. Therefore, to better relay the relational nature of teacher mobility, we engaged *positioning theory* to identify how people locate themselves in their interactions (Davies, 2000; Harré & van Langenhove, 1999).

We further illuminated positioning theory by using discourse analysis as a methodology. Discourse analysis allowed us to utilize both the broader discussions in educational research in conjunction with the local discourses in which the participants subscribed and participated. Approaching teacher mobility with the lens of positioning theory, and employing discourse analysis, helped us to account for power in ways other methods could not (Davies, 2000; Harré & van Langenhove, 1999). Positioning theory, specifically, enabled us to explore nuance in attempt and intention and to understand positionality as a navigational process rather than a fixed assignment (Davies, 2000). In this way, the methodology of discourse analysis is heavily intertwined with theory as both a means of understanding mobility and as a process of engaging in the local discourse itself (Patel-Stevens, 2004).

In the case of mobile teachers, we positioned individuals in school systems, but also in broader discourses of education, teachers, School-Based Agricultural Education (SBAE) teachers, and individuals' own subjectification inside their communities. We offer teacher mobility as a positioning phenomenon based on its circular nature. Figure 1 illustrates this point.

Figure 1.

Conceptualizing the discursive position of mobile SBAE teachers



Thinking of teacher mobility as a choice, through the lens of positioning, allowed us to view mobility as relational. The goal of our study was to illuminate mobility as much more than a school level detriment, and potentially even, a professional asset.

Study Purpose & Assumptions

The purpose of our study was to identify the positionalities of mobile SBAE teachers and SBAE influencers. We focused our attention on this question: How do mobile SBAE teachers and SBAE influencers position themselves and others in their co-constructed discursive context?

We defined *mobile SBAE teachers* as teachers who have changed schools at least once in their career (Atterbury et al., 2017; Feng & Sass, 2012; Gary et al., 2015; Goldring et al., 2014; Ingersoll, 2001; Ronfeldt et al., 2012; Ross et al., 1999; West & Chingos, 2009). *SBAE influencers* were those who supported and/or challenged the teachers with whom they worked. This had not been previously defined in the literature. However, based on those mentioned in our previous study (Haddad et al., 2019), we operationalized influencers to include administrators, alumni, and co-teachers. We did not include students as influencers, recognizing students are not in positions to make decisions related to the expectations imposed on mobile teachers.

Our study aligns with AAAE Research Priority 3, Question 2: “What methods, models, and practices are effective in recruiting agricultural leadership, education, and communication practitioners and supporting their success at all stages of their careers?” (Roberts et al., 2016). Despite mounting anecdotal evidence in SBAE, this work addresses a little explored field, that the advice offered, support conveyed, and action of the workforce trends toward mobility.

Literature Review

The purpose of this study was to identify the positionalities, and subsequent discursive positions, of mobile SBAE teachers and community influencers. To date, the discourses in the broader body of literature identify mobile teachers as an unexplored subset of turnover and attrition (Atterbury et al., 2017; Borrero et al., 2012; Davies, 1989; Harris & Sass, 2007; Hazari et al., 2015; Turner et al., 2013). School level attrition, while impactful, does not address teaching as a profession. *Professions* are careers that involve prolonged training and formal qualification (Oxford English Dictionary, 2022). Most often, teaching is considered among the professions, including law and medicine, but it bears marked structural and systemic differences from its professional counterparts. One particular difference, termed *stagedness*, bears critical implications for the teaching career. Teaching is different from law or medicine in that recent inductees to the profession perform the same tasks, at the same load, as veterans. Law and medicine, on the other hand, are *staged*. There are progressions of supervision and expertise built into the process of becoming a doctor or lawyer (e.g., resident, intern, paralegal, clerk). This lack of *stagedness* in teaching converges heavily on the mobile teacher, as their newness to a district means not only navigating the nuance of their discipline, but also the specific practice of their profession in a new space. Therefore, we used our literature review to outline the broader discourses related to career stagedness, socialization, and mobility.

Those studying teacher mobility internationally have recognized the necessity of considering teacher mobility as a system made of up *actors* (e.g., teachers, departments of education, schools, and school administrators) and *contexts* (e.g., school districts, unions, educational policy, and broader politics) (Ochs, 2012). Considering teacher mobility as a system better enabled the evaluation of best practices in recruiting and retaining mobile teachers, particularly as it shed light on the various influencers at play (Ochs, 2012). This consideration furthered the legitimacy of taking a profession wide (SBAE) view of mobility and migratory contexts. Notably, the majority of current education literature focuses on the teacher in the school (Atterbury et al., 2017; Feng & Sass, 2012; Gary et al., 2015; Goldring et al., 2014; Ingersoll, 2001; Ronfeldt et al., 2012; Ross et al., 1999; West & Chingos, 2009). However,

outside of the realm of education, mobility is often classified as a socialization process of engaging work (Berger & Luckmann, 1966). To contextualize our research, we grounded our literature review in the canonical teacher socialization literature. While dated, unpacking ideas of socialization found in *School Teacher: A Sociological Study* (Lortie, 1975) better informed our conceptualization and analysis of the broad discourses surrounding mobility.

Teaching as an Unstaged Profession

Socialization into teaching starts when teachers are students. In other words, teachers know what school is well before they find themselves facilitating a class (Lortie, 1975). Teachers are socially constructed as individualistic, conservative, and present-focused (Lortie, 1975), and this construction positions teachers. It requires they balance personal autonomy with professional alignment (Lortie, 1975). In our earlier work with mobile teachers, we found personal autonomy positioned the individualistic choice as productive (Haddad et al., 2019), however, *professional alignment* (doing what is expected based on your role) made mobility a less desirable alternative (Atterbury, et al., 2017; Feng & Sass, 2012; Gary et al., 2015; Goldring et al., 2014; Ingersoll, 2001; Ronfeldt et al., 2012; Ross et al., 1999; West & Chingos, 2009). Professional alignment pushes against the autonomy of mobility as a productive career choice.

Peterson (1978) extended Lortie's (1975) work, noting definition, bias, and method as challenges to describing the teaching career. In recognizing these challenges, Peterson (1978) also claimed teaching lacked a critical component to a true career: having a progression of sequenced steps of upward mobility. Upward mobility includes career advancement in position, pay, or responsibility (Peterson, 1978). Rather, teaching is *unstaged*, meaning classroom teaching does not have specific progressions of expertise within the profession. Most upward mobility in teaching involves leaving the classroom (Peterson, 1978). If a teacher is to improve their position, they must engage in horizontal mobility--in other words, moving between schools--while remaining a classroom teacher (Peterson, 1978). Peterson (1978) recognized the various improvements gained through horizontal mobility as significant victories and advocated horizontal mobility as a healthy part of teacher career patterns (Peterson, 1978). Even today, embracing horizontal mobility requires a more systemic view of teaching and education compared to an organizational one. Organizational approaches imply career incentives which are unavailable to the classroom teacher; as such, an organizational approach is at odds with the actual state of the teaching profession (Peterson, 1978). Instead, accountings of teacher career patterns should include job morale, affective changes associated with aging, perceived changes in school environment, shifting commitment to teaching, personal revitalization, and attitudes about teaching at retirement (Peterson, 1978). We specifically attended to job morale, perceived changes in school environment, and personal revitalization as components of this study.

Through her work, Peterson (1978) found teachers were personally revitalized following a move to a new school, a change in the subject taught, reassignment of duty, opportunity to take additional coursework, and the challenge of meeting the needs of new students. Our recent work with mobile SBAE teachers corroborated this finding (Haddad et al., 2019). While individuals identified success based on teaching circumstance (Peterson, 1978), the broader profession does not embrace mobility as the mark of a successful career.

Mobility in SBAE

We theorized challenges and positions are often easier to identify for mobile SBAE teachers. Newness to a situation supports this theory (Berger & Luckmann, 1966), but so does

the published expectation (or professional discourse) for the SBAE teacher. Their extensive engagement with a broad array of community interactions (e.g., FFA, SAE, classroom, etc.) (Phipps et al., 2008) requires they exercise an ability to identify their available positions, even if they do not articulate them as a component of their situational assessment (Harré & van Langenhove, 1999). The SBAE literature further supported this approach as researchers described SBAE teachers as filling multiple roles and being asked to navigate the unique identities of agriculturalist and teacher (Robinson et al., 2013; Shoulders & Myers, 2011). They are overworked (Traini et al., 2019), but also diligent, daring, and devoted educators (Roberts & Montgomery, 2017). Understanding discourses related to teacher socialization, stagedness, and mobility allows discussion of the mobile teacher in the context of a broader education system. Knowing these discourses were in play, our purpose was to identify the local positions mobile SBAE teachers and SBAE influencers discursively took up to navigate a broader system and context. Therefore, the research question guiding the current study was: How do SBAE teachers and community influencers position themselves in their co-constructed context?

Study Significance

Within SBAE and internationally, work has already been dedicated to understanding how teachers identify success when their career decision finds them changing schools (Haddad et al., 2019; Ochs, 2012; Rudder, 2012). In prior research, teachers resoundingly reflected on community support as a key indicator of whether their program move was a good choice (Haddad et al., 2019; Rudder, 2012). However, little research explores the interplay between SBAE teachers and their community to specifically elicit how teachers interact with support and challenge. We must explore teacher and community interactions as teachers enter and exit programs. This illuminates key pinch points in the teaching profession more broadly and allows greater understanding to support teaching careers.

The purpose of this study was to identify the discursive positions of community influencers relative to their SBAE counterparts. To date, the literature related to teacher mobility has focused almost exclusively on student impact and relationships (Atterbury et al., 2017; Borrero et al., 2012; Davies, 1989; Harris & Sass, 2007; Hazari et al., 2015; Turner et al., 2013) and left relationships with colleagues, administration, and others to the fate of anecdote. It is important to note that communities are the ones who must recover from the exit of a migrating teacher (Barnes et al., 2007; Bond, 2012; Boyd et al., 2011; Grissom, 2011; Hanushek & Rivkin, 2010; Keesler & Schneider, 2010). Our study was significant in its scope and approach as it undertook an examination of teacher mobility holistically, including various influencers: state staff, colleagues, administrators, and program alumni.

When bringing various actors into discursive interactions around power, multiple perspectives and divergent viewpoints will emerge (Davies, 2000). *Multiplicity* is the anticipated divergence in interactions. To account for *multiplicity*, our study took up a positioning approach to discourse (Davies, 2000). Positioning theory (Davies & Harré, 1990) exposed and challenged the positions into which societal norms placed people as speakers. We hypothesized new members of communities necessarily positioned themselves, pushed against positioning by others, and in turn, positioned others in hopes of finding support and navigating challenges. Positionality is inherent to mobile SBAE teachers as they interactionally enter a community, examine it, and make choices regarding adopting normalized values.

Theoretical Approach to Discourse

While teacher mobility has been examined from an organizational perspective, few studies have focused on mobility from the interactional perspective of an individual in a profession. Employing positioning theory as an approach to discourse analysis shed light on SBAE teachers' positioning members of their new community and the members' positioning mobile SBAE teachers. We conceptualized the community broadly, to include administrators, colleagues, former teachers, alumni leaders, and others, such as "Team Ag Ed" at the state level. This aligned with how mobile teachers talked about those most influential in their assessment of productive moves in our previous study (Haddad et al., 2019).

Sample

We focused on teacher mobility in one Agricultural Education program with consistent SBAE churn (i.e., a new teacher every five years for the last 30). It is important to note that focusing on one program did not inherently make this research a case study. While this specific program could be considered an example or *case* of teacher mobility or churn, our research question did not support case study as a methodology. Specifically, we were concerned with the interactions amongst participants. This required a single site but did not allow for case study methodology.

An ability to situate community knowledge and engage speakers in an accounting of the social and cultural factors influencing people's positioning of themselves and others, was essential to maintaining integrity in the examination of discourse using positioning (Patel-Stevens, 2004). Having taught in the district for five years, I (one of the researchers) was particularly equipped to situate this knowledge. The familiarity of my former school district (North Plains Consolidated High School, NPC, Oakville, NA) balanced the need for understanding social and cultural norms with operationalizing the assumptions of the theoretical approach (Davies, 2000). All references to the Oakville community and its members use pseudonyms, as agreed upon by the participants. We invited the last three SBAE migrators since 2003 (myself excluded), to participate in the study. All the teachers were currently involved with the broader education profession in some form, and at the time of the study, all three were still employed by the NPC school district. Two participated for the full duration of the study, and one withdrew participation in the co-iterative analysis while generating conclusions. The SBAE teachers in this study (Aaron and Stephanie) taught at North Plains Consolidated (NPC) for five years or fewer before making their next career move. The community influencers included two former industrial technology teachers (Ben and Caleb), the FFA alumni president (John), current assistant principal (Aaron; a former SBAE teacher), and state supervisor for agricultural education (Mark). Most of the data captured from Mark was contextual. As such, his data were used throughout the study to situate participant experiences within the context (discourse) of Agricultural Education for his state. During member checking, we confirmed the use and situating of his data.

Data Collection

We involved teachers and influencers in a reflective, autobiographical interview process to establish a more holistic presentation of the discursive context in which SBAE migrators were positioned for the NPC district. We operationalized Positioning Theory (Davies, 2000) with the methods of this study (Patel Stevens, 2004) in terms of reflexivity, answerability, and authenticity. Notably, multiple phases of the co-iterative analysis discussed below accounted for reflexivity. My position and embeddedness in the school site were salient to this study as

components of answerability and authenticity. We recognize, however, my interpretations of the context were my own, informed by my experience with the site and individual speakers (Harré & van Langenhove, 1999). As such, my interpretations were limited in broader applicability relative to the experience of others beyond this study, based on their own positionality, their positioning of others, and others' positioning of them. With reflexivity in mind, we produced findings discursively with participants.

We engaged participants in an iterative process to co-construct a picture of navigating newness resulting from mobility at NPC. Having worked with participants through their reflexive positioning, further semi-structured interviews, based in dialogue, allowed for an answer (Patel Stevens, 2004, citing Bakhtin, 1990) regarding the positions imposed by self and others (including research discourses). The semi-structured nature of the interviews highlighted different *episodes* (Davies & Harré, 1990) of the mobility experience: coming to teaching, prior teaching appointments, coming to, working at, and moving on from NPC (Haddad et al., 2019). The emphasis on understanding discourse warranted a semi-structured approach to incorporate meaning making in both the initial and secondary interviews (Patel Stevens, 2004). Interviews occurred via the Zoom video conferencing platform and in-person during November of 2019. All interviews were audio recorded and transcribed. Interviews ranged from one to two hours in-length, generating approximately 20 hours of audio data over 16 interview sessions.

Discussion of Findings

SBAE Migrators

Four themes emerged to describe how SBAE migrators positioned themselves and others in their co-constructed discursive context. In positioning oneself, individuals also position others (van Langenhove & Harré, 1999), therefore, we discuss SBAE migrator positioning both as positioning self and as positioning others in their co-constructed context.

This is Where I'm Meant to Be embodied positions recounting a sense of belonging. Beyond identifying from a particular geographical area, participants expressed ideas of belonging to a particular institutional position. Across this theme, teachers positioned themselves and those around them as *committed, geographically bound, connected, and supported/supportive*. Themes intertwined as teachers discussed support from various community influencers fostering greater connectedness in successful teaching in their community. Stephanie discussed:

I feel like I walked into a different situation. I feel like when teachers come in, the community is like, "You're not the last teacher," and that's a big thing to overcome. I was lucky not to have that because the person before me was a long-term sub they let go halfway through the year. And the community welcomed me with open arms, and I think they were happy to have someone stable again.

Conversely, when teachers did not feel supported by their community, they suggested a diminished desire to connect within the community and commit for the long-term. The quote above and the quote below provide examples of teachers' perceptions of community influencers fostering or rejecting positions of belonging. The former initiative on the part of the community influencers seemed to be expected, appreciated, and largely reciprocated.

Additional Duties as Assigned captured how these SBAE migrators positioned themselves as agricultural educators and FFA advisors, especially in light of the workload and

challenge of the job itself. Participants outlined the challenges of their positions in institutional roles, expressed as participants positioned themselves as less competent, but surviving and persevering through the role despite significant challenges. Aaron talked about it as a process of becoming good:

Eventually you'll be good, you'll make those connections, and you'll know who to call when you have a question. You can reach out to community members, you can build a program, and you can have those great interactions with kids, because really that's what it's all about.

As these teachers deliberated their *Additional Duties as Assigned*, they wrestled with positioning themselves and being positioned in their institutional roles. Teachers perceived the positions they occupied as rejected by community members when initiatives did not move forward, they were compared to others, or they felt others were out of touch with the work the SBAE teacher was doing.

I'm the Real Deal embodied a sense of being well-equipped to do the job. Beyond being able to perform well in an institutional role, participants expressed being able to elevate a program beyond what it was when they arrived. Across the theme of being *The Real Deal*, teachers positioned themselves with the dispositions to do the job well: *considerate, having a desire to build, resourceful, and experienced*. Stephanie discussed being able to build something as a significant consideration in accepting the job:

I was kind of hired with this promise of "do what you want. It will be your program and you can turn it into whatever you want it to be." That was pretty appealing to me. The reality was half the time I was teaching junior high, which was not my fave, and the other part of the time was the high school stuff...I added some of my own stuff but was tied down schedule wise by the junior high electives and that wasn't something I was really into. They wouldn't let me do work-based learning. So that was another thing I didn't get to do that I had seen very successfully at other schools.

Within the differences of these teachers' experiences, the migratory context for SBAE teachers varied, with many evidences present of the constant negotiation of establishing the position of the best person to do the job at that time.

Everyone is Special unpacked positions of purpose derived from being different from one's peers. Participants discussed enacting their own agenda and plans for what a program should be, particularly as it positioned them as more capable than their peers. Capability served participants well when their agenda aligned with those with whom they interacted. It broke down, however, when limits were imposed on a person's autonomy, challenging their ability to position themselves as independent in their work. Aaron talked about the nuance of teaching agriculture relative to his peers:

I think I had a different attitude about my expectations with kids; what I wanted to get out of them. I always had the mindset, "This is an elective area. I'm trying to make this fun. I'm trying to make this interesting and worthwhile." I think that's a different mindset than let's say a Math, or English, or Social, or Science teacher. You gotta take 12th grade English. So, I think [the ag] position lends itself to that, which comes with different challenges too. Because you got to sell it or you're out of a job, so you gotta do that and it can't be fluff. It can't be just a fun and screw around type of thing.

Each teacher saw himself or herself as special, positioned as *unique, visionary, refreshed, lucky,* and *autonomous*. Stephanie, however, also felt like she could not do her job well as limits were imposed on her autonomy. Relationally, holdover expectations strained relationships with feeling challenged rather than supported; they limited teachers' options to engage, working to reject a position of *limitation* rather than flourish in a position of *autonomy*.

SBAE Influencers

Four themes emerged to describe how SBAE influencers positioned themselves and others in their co-constructed discursive context. Influencers, for the sake of this study, were those with close connections to the success of a SBAE teacher or program. We drew on tellings from our SBAE instructors' co-teachers in industrial technology (Ben and Caleb), an administrator (Aaron), and the alumni chapter president (John) to answer our research question.

We're All Doing the Best We Can recognized how influencers saw the job of agriculture teacher as doing hard work in challenging situations. While influencers recognized SBAE teachers' jobs as difficult, it did not excuse agriculture teachers from rising to the challenge. Ben put it this way:

I think we were just self-absorbed into what we had to do for the next few days that we didn't pay attention to [making connections]. I'm sure the administrators didn't. It's a little bit of the sink or swim kind of thing...if they don't have the people skills to get there, they kind of sink for a while.

We're All Doing the Best We Can captured recognizing the work, but also saw the challenge as part of the job for which an agriculture teacher must be prepared. Additionally, influencers identified successful agriculture teachers as *overwhelmed* and up against significant *challenges*. Caleb said this:

Well, [the job is sustainable at a high level for one person], but you can't be married. You can't have children. But you have to find that balance. You establish it and then you back off. Had I remained in Oakville, I would've backed off. I've been working at backing off...You start doing those things that are important to you that you'll prioritize.

SBAE teachers positioned as less successful were seen as *imposters*; not up for the task and underqualified to address the needs of the community surrounding NPC.

You Gotta Want It encapsulated ideas of influencers positioning themselves as able to provide substantial support if support was received appropriately from the SBAE teacher. This theme recognized how others, particularly administrators, may be perceived as unsupportive. However, the recounting influencer never described himself as unsupportive. Influencers sought connection and ways to provide support but had strong resentment around missed opportunities from those they were trying to help. As John said:

It's up to each individual. Who we have right now, there's no time to talk about anything. They're going to do it their way. We attempted to give them a heads up of how things had moved forward or some successful things they maybe want to take a look at and it was just like, "Fine, but I'm doing it this way."

Contrary to anecdotal ideas of support being material (e.g., resources, money), these community members specifically discussed *support* as time, attention, mentoring, and friendship.

Double Standards captured the variety of expectations from SBAE influencers relative to the expected job and involvement of the SBAE teacher. Overall, expectations suggested SBAE teachers should be in a continuous state of development while leaning on the community for program expectations and support. At the same time, teachers should operate autonomously as individuals. Aaron discussed his vision for the agriculture program this way:

If it's your program...I want you to have vision, keeping in mind what the community needs and wants, what your strengths and weaknesses are...I want you to grow the program...But that teacher...[has] to be the champion, trying to develop their vision of their ag program.

Competing demands and expectations comprised a difficult landscape to navigate, as a brand-new teacher or as an experienced teacher making a program move. Explicating expectations before going into a job is nearly impossible, due to the multiple influencers holding them and the varied ways in which they unfold.

All or Nothing recognized an all-in approach to reciprocal investment. For our purposes, reciprocal investment is an equal or greater display of commitment from those invested in those investing. Ben discussed investment in terms of where teachers live:

In a town the size of Oakville, they really appreciate the teachers that live in town, go to their churches, are there for other activities, and they see go downtown to the parade, and all that stuff...People really appreciate if you're living in the town you work in, but it just can't work that way much anymore.

Influencers positioned themselves as invested in the success of the SBAE program as a reflection of the community and the community as a reflection of the program. This community took reciprocal investment as a serious charge issued to the teachers with whom they entrusted the care of their students. *Investment* was the pinnacle of the *All or Nothing* theme as *luck*, *responsibility*, and *continued growth* identified how community influencers positioned themselves and others as *invested*.

Implications, Recommendations, & Conclusions

In discussing implications, recommendations, and conclusions, we return to the broader discourses to which these teachers and influencers subscribed when recounting their experience. While the specifics of six individuals' experiences are not generalizable, the discourses in which they practice are. Therefore, we used our implications, recommendations, and conclusions to address broad discourses, supported by specific experiences, to supplement the professional conversation surrounding teacher mobility.

Implications

This is Where I'm Meant to Be, *Additional Duties as Assigned*, *I'm the Real Deal*, and *Everyone is Special* showed these SBAE teachers positioning themselves as capable, well-disposed, visionaries who belonged in their roles in their communities. Dissonant expectations were magnified, especially if unclear when the job was accepted. These expectations could be especially challenging to navigate as mobile teachers brought the expectations from their former district and community with them. What a district gained in experience was also juxtaposed by the established habits and expectations from a former way of practicing.

In aligning expectations with the socialization of teaching as an individualistic, conservative, and present focused profession (Lortie, 1975), we must be willing to question what positions our study exposed. For SBAE teachers, but especially mobile SBAE teachers, positioning allowed these questions: 1) What is expected of SBAE teachers and migrators? 2) Where do those expectations come from? 3) Which expectations were held across teachers, and which were released when new teachers enter the context? 4) How were discourses engaged to clarify expectations for all involved?

We found implications related to support, connection, and commitment. These mutually influencing positions, and the broader discourses to which they apply, were key to teachers finding their ideal location to engage in their career (Haddad et al., 2019). The challenge for the SBAE migrator is clearly identifying, for themselves, why they are moving (Haddad et al., 2019) so they can better articulate how they are able (or not) to meet the expectations of the various community influencers they will engage to develop a program. If teachers are moving to improve their situation (Peterson, 1978), they must be intentionally autonomous throughout the search process about what constitutes a better situation.

Recommendations for SBAE Teachers

Mobile SBAE teachers must find clarity regarding their responsibilities as they step into new communities. Only with clarity in responsibility can teachers act with their desired autonomy. Researchers must be cognizant of proposing solutions adding to a teacher's workload, given the implications of workload in this study and others (Traini et al., 2019). As a recommendation, co-teachers and administrators encouraged teachers (mobile or not) to act in their communities by asking of any task: 1) Who else could aid in delivering this service to students? 2) How do I communicate to others that this partnership has been established?

Exiting a program is inevitable. Whether from retirement, mobility, or other measures, mobility permeates the workforce. Predecessors played a significant role, often tacit and sometimes intentional, in establishing expectations for their successor. Understanding the role of the predecessor necessitates balancing what is helpful with what is feasible. It is essential SBAE teachers consider the work cycle in terms of what they leave for the next person. Teachers must ask themselves: Am I replaceable? What expectations am I establishing for my successor? Asking these questions begins to elevate replaceability to a measure of success.

Lastly, for the SBAE teacher, a notable deliberation may be the expectation of the community regarding the teacher's presence beyond school hours. Therefore, in contemplating a program move, how important is it to live in the community to which you migrate? Furthermore, if we ask community influencers to invest and engage, on some level, SBAE teachers must be prepared to return the investment. It is beyond the scope of this study to determine at what cost such investment occurs but should be part of the evaluation process for mobile teachers as they seek to relocate.

Recommendations for SBAE Influencers

Across this migratory context, community members positioned themselves and the SBAE teachers with whom they worked in a variety of ways. *We're All Doing the Best We Can, You Gotta Want It, Double Standards*, and *All or Nothing* came together to describe how community members sought to be understanding and supportive of their SBAE teachers, but their support was based on their own experience. If a community member offered support, it followed with an

expectation that their support would be utilized. Using support was a means of conveying investment in the community for the SBAE teacher. Support was a reciprocal process of engagement for community influencers in their interactions with SBAE teachers. With this conceptualization of support in mind, we propose the following recommendations for the influencers represented in this study.

Administrators must be clear in their desires and expectations for SBAE program management, particularly as it pertains to program growth. Clarity in expectations was essential to avoid a misalignment in vision between administrators and SBAE teachers. Often, a lack of alignment in available resources challenged the opportunity to carry out the “ideal” vision.

By seeking belonging and connection, fellow teachers grounded their SBAE counterparts. For these mobile teachers, establishing connections was equivalent to identifying and maintaining realistic program expectations with the broader community. Fellow teachers also held key insight regarding expectations and provided much needed reality checks, preventing their co-workers from taking on too much.

FFA alumni chapters were encouraged to provide a community liaison (e.g., former teachers, co-teachers, administrators, or community members) who can acquaint the new teacher with key influencers in the community. Alumni expressed their role as more than a human resource, recognizing the job as too big for just the agricultural educator. Identifying opportunities for new teachers to receive support was essential. These SBAE teachers already had a high logistical load to manage, as do other SBAE teachers (Traini et al., 2019). Sharing the load of an integrated program is a key reason for the existence of alumni chapters. Therefore, reducing SBAE teachers’ decision load is essential to accepting offers for help.

Conclusions

The four purposes of agricultural education, currently comprising the broader professional discourse, include SBAE being for agricultural literacy, career exploration, career preparation, and preparation for further study in agriculture (Phipps et al., 2008). These present a specific challenge for the SBAE migrator related to positioning. A SBAE teacher’s vision of the purpose of agricultural education must align with their community influencers’ if it is to be positioned as supported. Influencers at all levels are strongly encouraged to communicate a clear, single purpose for agricultural education and structure pre-service programming, messaging, policy advocacy, and program implementation around the key purpose.

Notably, community influencers recognized the difficult role their SBAE teacher occupied. They also offered substantial help and support to manage the workload, and in fact, positioned themselves as rejected if the assistance was not accepted. The underlying assumption, based on the data presented here, is community members sought engagement. Despite being busy themselves, they were eager to be involved. Community influencers were willing and able to provide much greater leverage to a total SBAE program including financial stability, institutional knowledge, content expertise, facilitation of community connectedness, support for challenging students, and input and visioning for forward progress of the program.

Positioning exposed discourse as much as discourse exposed positioning. In reflecting on available positions and assigned positionalities, these teachers uncovered a discourse situating their communities as essential to their work. Influencers also situated themselves this way, but further contributed to the discourse of support being something you engage in (beyond

something you provide). The discourse exposed here challenges all involved to identify mutually compatible ways forward. Positioning is neither good nor bad. Positions merely locate people in relation to others through their interactions (Davies, 2000; van Langenhove & Harré, 1999). It is essential to ponder how the exposed location in interactions clarifies expectations, locally and for a broader profession to support teachers across their career trajectory.

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A Conceptual Paper: Analyzing STEM Integration through AFNR Using Disciplinary Ways of Thinking

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Abstract

Understanding educators' disciplinary ways of thinking is a critical step to an effective educational practice of science, technology, engineering and mathematics (STEM) integration through agriculture, food, and nature resources (AFNR). In this conceptual paper, we synthesized current related literature to provide a new definition of STEM integration that has a broader and development approach to integrated STEM learning. We provide a different view how disciplinary ways of thinking affects teachers' beliefs about STEM integration. We also shared examples of different levels of integrated STEM through AFNR learning and how teachers' beliefs and practices STEM integration support the role of disciplinary ways of thinking. At the end of the conceptual paper, we emphasized the importance of ways of thinking and identified challenges teachers need to navigate when using integrated STEM teaching and learning.

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Introduction

Worldwide, science, technology, engineering, and mathematics (STEM) education is experiencing reform to try to keep pace with the rapidly changing world. STEM integration represents a way to think about curriculum change. Although the theoretical basis for integrated STEM teaching is familiar to many STEM educators, the current educational reform movement no doubt creates certain barriers and creates challenges in the K-12 STEM education system (Herschbach, 2011). In the secondary education level, STEM subjects are typically taught separately, and tend to have disciplinary-specific curriculum models (Herschbach, 2011). Science and mathematics are considered as foundational and formal knowledge and are aligned with standardized tests and discipline-based structure and rules, which could be argued that science and mathematics are focused on preparing high school students for college. In contrast, technology, engineering, and agriculture, are recognized as career and technical education (CTE). CTE (career clusters) is considered to be practical subjects that apply some science and mathematics concepts. CTE courses (aka, vocational-oriented courses) are aligned with teaching high school students how to apply knowledge in real-world settings and develop 21st century skills, which could be argued that they are focused on preparing high school students for careers and the workforce (Heyward, 2019). Because each STEM subject has its unique characteristics, K-12 science, mathematics, and CTE educators are overwhelmed about the changes and are unclear on how to navigate these challenges (Wang et al., 2020). In order to successfully

integrate STEM subjects in K-12 classrooms, understanding educator’s beliefs is the first step and at the heart of effective educational practices of STEM integration (Wang et al., 2020).

The purpose of this conceptual paper was to define STEM integration and describe disciplinary ways of thinking. Based on literature, our approach was to we provide a new definition of STEM integration that has a broader and development approach to integrated STEM learning after comparing STEM subjects in K-12 education. Next, we share examples of different levels of integrated STEM learning to explore the role of disciplinary ways of thinking for a broader and developmental approach. In particular, the examples that we presented were used agriculture, food and nature resources (AFNR) to demonstrate how AFNR were integrated into STEM subjects to represent S and M integrated into CTE. At the end of the paper, we shared a couple conclusions and identified some challenges teachers will likely navigate when using a broader and developmental approach to integrated STEM teaching and learning.

Definition of STEM Integration

In framing STEM integration, Herschbach (2011) argued there are two basic ways STEM curricula are organized: (1) correlated curriculum; and, (2) broad fields curriculum. Table 1 illustrates our understanding of Herschbach’s description of these two curriculum models. The *correlated curriculum* represents a multidisciplinary integration approach where existing content areas retain their formal knowledge structure and teachers coordinate to illustrate interrelationships between or among related content areas. The level of adaptation is limited, and the existing structure of formal knowledge frames the curriculum design and instructional process. The *broad fields curriculum* is an interdisciplinary integration approach where related content areas are reorganized around an activity or sequence of activities. As such, individual subject matters lose their individual identities and the level of adaptation is much higher in coordinating instruction using a new framework that is activity or project-driven.

Table 1.
Comparison of Two Basic STEM Curricula

Considerations	Correlated	Broad Fields
Disciplinary	Multidisciplinary	Interdisciplinary
Content Areas	Retains identity of each subject	Individual subjects may lose their separate identities
Organization of Courses	Taught as separate subject matter courses	Cluster of related subjects are organized into a single area of study or sequence of related courses
Coordination and Planning	Among different stand-alone content areas	Commonly done through a sequence of activities rather than structure of content
Challenges	High level of communication among teachers to reorganize existing subject matter to coordinate relationships among	Clear organizing framework is needed to integrate related content areas into a single course, and structure inherent in existing content areas is lost

	subjects	
Level of Adaptation	Very limited	Moderate or substantial
Instructional Focus	Formal knowledge taught deductively	Applied knowledge taught inductively through activities (e.g., design process)
Organization of Knowledge	Linear and sequential acquisition of knowledge	Non-linear and driven by solving problems

Moreover, Herschbach (2011) argued that integrating science and mathematics with vocational-oriented subjects (aka, CTE), such as technology, engineering, and agriculture, would help students have an enhanced understanding of knowledge, make learning more relevant, and be more college and career and workforce ready (Heyward, 2019). For example, some scholars agreed that engineering design problems have the potential to help students practice problem solving by using science and/or mathematics knowledge through a systematic and iterative approach (Bryan et al. 2016; NRC, 2014). Table 2 summarizes our analysis of Herschbach’s (2011) comparison of science and math to vocational-oriented subjects, such as technology, engineering, and agriculture.

Table 2.
Comparison of Science and Math to Career and Technical Education Subjects

Considerations	Science & Mathematics	Technology, Engineering, & Agriculture
Structure of Knowledge	More formal structure “Formal Knowledge”	Less formal structure “Applied Knowledge”
Kind of Knowledge	Conceptual & Theoretical	Technical & Contextual
Uses of Knowledge	Formal knowledge & formal knowledge applied to specific activities	Formal knowledge applied to specific activities & knowledge specific to tasks
Knowledge Selection	Non-selective; instruction organized around content	Selective; instruction organized around process and content is selected and applied around application
Purpose of Knowledge	Understanding of intellectual content	Utilitarian; skill-training use
Problem-Solving	Deductive, theoretical	Inductive, applied
Disciplinary	Single academic subjects of formal disciplinary knowledge	Interdisciplinary and integrated subjects that apply formal knowledge
Epistemological	S: Discovery and advance	T: Production and use of abstract and

Characteristics	knowledge M: Analytical tool and analyses	concrete artifacts E: Design of artifacts by selectively using knowledge from STM
Instruction	Independence (stand-alone)	Integrative

A common definition of integrated STEM teaching approaches that is accepted by many scholars is to mirror solving a real-world problem in a complex designed system, where students use knowledge and skills from multiple disciplines that relate to their everyday lives (Bryan et al. 2016; Bybee, 2010, 2013; English, 2016; NRC, 2014; Scherer et al., 2019). We argue that there needs to be a more disciplinary inclusive definition of integrated STEM with CTE career clusters to help bridge cross-disciplinary learning to increase the potential of reaching transdisciplinary learning. Therefore, we define STEM integration as *“Integrated STEM education is intentionally and purposively blending multiple disciplines (i.e., academic and vocational) to help students meaningfully learn and apply academic content through real-world problems framed in designed complex systems and grounded in career and technical contexts that facilitate multidisciplinary, interdisciplinary, or transdisciplinary learning for the development of life-long and workforce development connections and skills.”*

Disciplinary Ways of Thinking

Disciplines consist of organized knowledge, including core concepts and professional practices, which is supported by foundational beliefs and assumptions that represent a way of thinking in the field (Turner, 2006). In Table 3, we conceptualized how different disciplines have different ways of thinking. For example, the nature of science represents how scientists think and solve problems. Engineering and technological design represents how engineers and technologists think and solve problems. Applied and agroecosystem thinking represents how agriculturalists think and solve problems. Next, we explain these disciplinary ways of thinking and how they can play a role in integrated STEM education.

The STEM disciplines have unique epistemological characteristics that should be understood to maintain the integrity of each discipline and know how they each contribute to integrated learning (Herschbach, 2011). Disciplines accumulate and articulate sophisticated knowledge and understandings through scholarly endeavors (Rogers, 1999), and it is important to learn through different disciplines because students can learn “significant ways of knowing that have been built by thinkers over time and that operate in and shape our society today” (p. 35). These unique epistemological characteristics are considered “ways of thinking,” because this situates these epistemological characteristics within each disciplinary field, especially from a professional and expert’s perspective in the discipline and workforce, and it easier to communicate the concept of how scientists or engineers think. We summarized the ways of thinking for four disciplines in Table 3. A fourth discipline was included because AFNR bring an additional and unique way of thinking as a CTE subject area. Solving-problems is a unifying process across all disciplines, yet each discipline has unique epistemological characteristics that represent how a professional in each discipline would be informed by a way of thinking to solve a problem. Although each discipline has defined epistemological characteristics and ways of thinking, some similarities exist across the different disciplinary ways of thinking.

Table 3.

Ways of Thinking and Problem-Solving Process of Disciplinary

Disciplinary	Way of Thinking	Problem-Solving Process
Science	Nature of Science (Scientific Method)	Scientific Inquiry
Technology & Engineering	Design Process	Engineering Design Process
Mathematics	Nature of Mathematics (Science of order, logic, and representation; mathematizing and structuring)	Reasoning and Representation (e.g., patterns, numbers, shapes, and modeling)
Agriculture, Food & Natural Resources	Applied Thinking & Agroecosystem Thinking	Pragmatic Experiences (e.g., learning by doing, observations, and conversations) and Systems Thinking

Nature of science is the way of thinking for scientists. Science involves asking questions about the world and then developing scientific investigations to answer the questions (Abd-El-Khalick, 2012). The nature of science is guided by empiricism, inference, creativity, theory, tentatively, and deductive / inductive / hypothetico-deductive inquiry (Abd-El-Khalick, 2012). Teachers use inquiry-based learning as a pedagogy to simulate the scientific inquiry process that scientists use to solve problems. It is important to note that the scientific inquiry process can be conducted in multiple ways to ask questions, collect and analyze evidence, and community understandings of the phenomenon, which also is known as scientific method (NRC, 1996).

Design process is the way of thinking for technologists and engineers (Moore et al., 2014; Moore et al., 2020). The argument could be made that engineers are more theoretical and design tools, whereas technologists are more applied and make and/or maintain tools. We see technology and engineering as being complementary in using the engineering design process. The engineering design process is an iterative process that involves formulating or identifying the engineering problem (including researching the problem and identifying constraints), planning a design solution (including brainstorming different solutions and evaluating competing solutions), and testing and evaluating a prototype or model (including data collection and analyses for feedback in redesign). This design process is repeated until a desirable design solution is created (Moore et al., 2014; Moore et al., 2020).

Nature of mathematics is the way of thinking for mathematics (AAAS, 1990). Mathematics is a science of order, logic, reasoning, and representation. Mathematicians use a process known as structuring to solve problems. Structuring can be accomplished through mathematizing and modeling. Mathematizing to structure real-world and mathematical problems known as creative structuring processes. Structuring can be notation, diagrams, definitions, analyses, or models to a class of problems that lead to solutions (Selden & Selden, 2005). Selden and Selden explained mathematizing is “a process of consideration and reflection that alternates between two forms—horizontal, during which the mathematics at hand becomes more familiar and is broadened, and vertical, during which new mathematics (notation, algorithms, definitions, etc.) is created” (p. 9). Next, modeling is another form of structuring, which may involve adding structure (e.g., variables, diagrams, equations, functions) to a familiar real-world or mathematical

problem “with a view to converting the given problem into a more tractable one in a (or another) familiar mathematical domain” (Selden & Selden, 2005, p. 9). Finally, mathematicians use another form of complex thinking and mathematizing called validation or validating proofs. Teachers facilitate mathematizing for students using inquiry-oriented pedagogy to help students explain and justify their thinking (Selden & Selden, 2005). Mathematics can be used to express ideas or solve problems through analogies of things or natural phenomena abstractly, manipulating the abstractions to illustrate new relationships, and communicating the abstraction to communicate meaning about the thing or natural phenomenon (AAAS, 1990).

Applied thinking and agroecosystem thinking is the way of thinking for agriculturalists. Agriculture as a discipline was informed by pragmatic thought (Mars & Ball, 2016; Talbert et al., 2005), and applied learning in agriculture is rooted in experiential learning and authentic learning (Knobloch, 2003). In agriculture, a common thread was based on inductively solving problems in a real-world context based on four tenets: (1) John Dewey’s learning in context; (2) Seamen Knapp’s learning by doing; (3) Rufus Stimson’s learning through projects; and, (4) William Henry Lancelot’s learning by using knowledge through solving problems and explaining knowledge (Knobloch, 2003). Learning in agriculture has used an integrated model of experiential learning (Croom, 2008) that (1) promotes application of academic subjects through an integrated curriculum (Talbert et al., 2006); (2) connects learning to thinking and applying knowledge to careers and life-long learning (Knobloch, 2003); and, (3) holistic student development of 21st century skills to become contributing citizens in a global society. Ball and Knobloch (2005) shared, “The pedagogical roles of the agriculture teacher are complex and varied” (p. 55), and it is important that agriculture teachers understand the ill-structured nature of how to teach concepts in the agriculture and food system. Further, Mars and Ball (2016) found agriculturalists’ ways of thinking were varied and informed by cultural and generational transmission, individual and community engagement to address local food system needs, and production efficiencies and economic sustainability.

As such, Knobloch (2003) stated that agricultural educators and the development of future agriculturalists was situated in the context of the social, economic, political, and agricultural systems. In the 1970s, system thinking became more prevalent among agricultural scientists and became known as agroecology. Agroecosystem thinking makes food systems decisions that are productive and efficient while being economical and cost-effective, environmentally sustainable, and socially responsible and acceptable to consumers (Agunga et al., 2005; Raven, 2020). Systems thinking considers a system as a whole and how elements of the system interact with each other (Bartlett, 2001; Kasser, 2018; Ponto & Linder, 2011). System thinking considers how different elements of the system affect each other and the intended and unintended consequences of making various decisions (Ponto & Linder, 2011). It is complex to understand how to integrate social, economic, and behavioral sciences into science and engineering (NRC, 2012). Agriculture, food and natural resources helps facilitate the integration of social, economic, and behavioral sciences because the production system is situated in the environmental system to serve consumers in exchange for economic and social value (Raven, 2020). Charoenmuang (2020) argued food systems education is an interdisciplinary education the “encourages reflective thinking and judgment by helping students use analysis, synthesis, and evaluation in problem-solving oriented approaches; and representing a complex view of

knowledge to build the abilities to recognize, evaluate, choose among, and integrate multiple perspectives (Hilimire, 2016)” (p. 36-37).

These different ways of thinking can contribute and flavor integrated learning experiences for students. Interdisciplinarity and integrated STEM education is blending different disciplines together to create new meanings or new solutions to real-world problems (Raven, 2020). Because disciplines are defined by a corpus of knowledge and epistemic characteristics, ways of thinking provide a representation of different approaches to how professionals in specific disciplines solve problems. For example, a scientist would solve a problem using the nature of science, whereas an agriculturalist would solve a problem by inductively testing possible solutions based on feedback from the system components. The different approaches to solving problems provide teacher educators more common language to seeing how different disciplines see and approach solving problems differently. This helps facilitate solving complex problems by facilitating different disciplines to blend together and facilitate interdisciplinary learning experiences for students. Integrated learning is more about using a way of thinking that is representative of a discipline and how the ways of thinking inform the learning process when mixing content and context from different disciplines. As such, we provide five examples of how different disciplinary perspectives informed the development of integrated STEM education units.

Integrated STEM through AFNR Examples

The examples that we provided in this section were developed in two STEM teaching methods courses (and teacher professional development workshop modeled after one of the courses) at Purdue university. Predominately, the 3-credit graduate courses aimed to equip graduate students and upper-level undergraduate students, as preservice educators, with the knowledge and skills to develop integrated STEM through AFNR mini-unit (Ryu et al., 2018; Wang & Knobloch, 2018). The final product of each mini-unit contained three to five lessons, and each lesson was about 45 to 60 minutes. These mini-units demonstrated the different structure of integrated STEM through AFNR teaching when teachers hold different disciplinary ways of thinking (Table 4). These examples showed that preservice educators tended to start teaching by being content-focused. Then, they transitioned to become learner-focused by shifting to activities (hands-on learning), problem-based learning, design-based learning, and/or inquiry-based learning.

Table 4.
Integrated STEM Examples

Disciplinary Focus	Disciplinary Process/Thinking	STEM Content Knowledge	Contextual Knowledge
Single CTE Discipline	Applied thinking	None/Limited	Understand byproduct from animals, such as wool from sheep
Single S/M Discipline	Science inquiry & scientific method	S: Force & motion M: Algebra and data interpretation	Design a hydroponics
Multidisciplinary	Applied thinking & science inquiry	S: Priorities M: Algebra	Understand and connect wool priorities and production

Interdisciplinary	Scientific inquiry, scientific method, & engineering design	S: Priorities, density, and buoyancy M: Algebra and data interpretation T/E: Engineering design	Design a sturdy chair that can pass tensile strength test.
Transdisciplinary	Nature of mathematical (modeling) & Agroecosystem Thinking	S: Food desert M: Function, logic, and modeling T/E: Google Maps & Food Desert Index	Design a Food Desert Index that could be used to weight factors that might contribute to food distribution and economics problems in a local community

Single CTE discipline. The *Where'd You Get That?! By-products of Animals in Agricultural Settings* mini-unit was developed by a non-formal educator, who was a licensed high school agriculture teacher. The mini-unit had five lessons that focused on introducing animal by-products (e.g., ice cream, bee wax, and wool) to fifth grade students. The overarching learning objective was “student understanding and knowledge through STEM-related activities by raising awareness of where by-products originate....” Each lesson in the mini-unit followed the same instructional structure. A lesson started with reviewing what students had learned from the previous lesson. Then, the educators taught background knowledge about the by-products, such as how people sheared sheep to harvest wool, and how wool was spun into yarn. Then, students did hands-on activities, such as “shaving” cream off of a balloon using a craft stick, which the shaving cream represented a sheep’s wool. Then, the educator asked students about the purpose of shearing a sheep and usage of wool at the end of the lesson. When asked how integrated STEM plays a role in the lessons, the educator, who developed the lessons answered, “In my opinion, I feel that STEM [integration] obviously...like a tool that’s utilized to teach the content...” As for the STEM content, the educator said, “I wanted them [students] to understand that everyday household items that they see actually come from animals. They [students] did not see these [STEM and AFNR] connections.” The educator’s perspective implied he wanted students to understand applied thinking using agriculture and food activities.

Single S/M discipline. The *hydroponics lab* mini-unit was developed for ninth grade integrated chemistry and physics students by a licensed high school science teacher. The mini-unit included five lessons that focused on conducting experiments to test different variables that might affect plant growth in a hydroponics system. For example, determining the power needed to pump water in a certain height was the learning objective of the *Power vs. Height Pumped Lab* lesson in the mini-unit. Each lesson of the *hydroponics lab mini-unit* followed the same instructional structure. In the beginning of the lesson, the educator proposed a problem, such as how high the water can be lifted by the pump? Then, students used steps of the scientific method to conduct scientific experiments. Students predicted an outcome, collected data, graphed the data, and interpreted data. At the end of each lesson, students reported and explained the relationship between the variables using their data. The purpose of integrated STEM instruction was to teach science content to be used to solve a problem. The educator, who designed the mini-unit, said, “Students need to solve a real problem at the end of an integrated STEM lesson. So, they’re going to use science concepts whatever it is to solve problems.” As for the STEM content in the mini-unit, he indicated that “Students need to understand and tell me how high the pump can pump the water. So, I gave both variables [time/height]. By doing scientific experiments,

they learned the concept of force and motion, and could apply that to modify the water pump in a hydroponics system.” The educator’s perspective was that he wanted the students to learn science content through a deductive approach of scientific inquiry. He wanted students to learn content by working through the scientific process.

Multidisciplinary. The *Sheep Byproducts: Properties of Wool* mini-unit was developed by a non-formal educator, who was a licensed high school agriculture teacher. It had three lessons to educate third graders about sheep and their byproducts from start to finish. In the first lesson, students explored how much wool is needed to make everyday products. Students calculated how many sheep it takes to create a ball of wool. The lesson focused on adding and subtracting multi-digit whole numbers and recognizing the relationships between addition and multiplication. The second lesson focused on the properties of wool like its ability to retard fire, and why wool is a desirable fiber that used to design clothes for certain purposes. Lesson two guided students to practice scientific method through science inquiry. Lesson three asked students to use a simple loom to weave a small piece of fabric. Lessons attempted to build on one another but did not have strong disciplinary connections. Each lesson focused on one STEM subject area, such as mathematics was the main concept that students learned and practiced in lesson one, and lesson two focused on conducting scientific experiments through science inquiry. Although the mini-unit attempted to incorporate engineering design in lesson three, students did not need to use the content knowledge that they learned from the previous lessons to weave a fabric by using a craft loom machine. The educator, who developed the mini-unit, acknowledged the mini-unit did not have every piece of STEM integrated at the same time. Purposeful STEM integration was what the educator believed when she developed her lessons. She indicated, “I don’t want the lessons to feel like they were doing math or science just for the sake of doing it, but for them [students] to understand that math and science are real-world experiences in agriculture that people in the past and today use.” When it comes to the role of STEM concepts, the educator said, “I feel this is where I put the most effort into, making sure what they [students] were learning was transferable skills like the scientific process and mathematical equations.” As such, the educator’s perspective reflected she wanted students to learn mathematical representation and applied thinking in a complementary and relevant manner.

Interdisciplinary. The *Ultimate Building Material* mini-unit was developed by a non-formal educator, who worked as technical staff in a wood lab. The mini-unit had three lessons that focused using science concepts, such as buoyancy and density to determine properties of different wood species, and design and make quarter scale chairs. The mini-unit was designed for upper elementary and middle school levels. Students conducted several experiments in the first two lessons to calculate volume, and density of different wood species. For example, students made a prediction if a wood material will sink or float in water and used the data that they collected to synthesize how density and buoyancy are related. The first two lessons helped students learn the relative strength of different wood species based on densities. Students followed scientific methods to conduct experiments in lesson one and two. In the third lesson, students used engineering design process, and what they learned about the density and strength of two different wood species in the first two lessons to design and make a chair. Students learned that there are often trade-offs between weight and strength when designing a chair. After students designed and built the chair, they tested (aka, broke) their chairs using a test apparatus. At the end of lesson three, students used mathematics and science knowledge and skills to

analyze the test results and presented them in the class. Lessons built on one another and had strong disciplinary connections. Students needed to apply what they used in the previous lessons to help them design their final product. The educator, who developed the mini-unit, believed that STEM integration is “using knowledge gained in math and science to create unique solutions to solve problems and for innovation.” As for the STEM content, he said, “The lowest level [STEM integration] includes some math calculation, science fact, or using technology such as the internet. This helped students create an awareness of connections between STEM disciplines. The highest level of integration is where the STEM knowledge is applied to solve problems. This often includes designing something using math skills, science knowledge, and technology in a giving context.” As such, the educator’s perspective indicated he wanted students to learn the engineering design process and test wood product variables using scientific inquiry to solve the problem. Engineering design and scientific method were integrally interwoven and were simultaneously used to solve the design challenge.

Transdisciplinary: The lesson *Barriers to Food Access in Your Community* was the first lesson of the *Design a Greenhouse* mini-unit that focuses on building context for food insecurity in urban areas. The lesson was developed by a pre-service technology education teacher. The lesson asked high school students to define “food desert” by weighing various factors, synthesizing statistics and information in order to draw conclusions to create a mathematical model (i.e., Food Desert Index) that could be used to explain their view of food desert. The educator first presented an existing definition of a food desert and asked students to identify the areas of the definition that seemed vague or unclear. Then, she proposed the question “what do food deserts look like in my community?” and asked students to investigate the problem. Students used Google Maps to investigate the number of grocery stores (aka, food markets) where they could buy fresh food in a community, and measure distances and time (i.e., walking, public transportation, driving a car) to go to grocery stores. Students also use city data from the local government, such as average income, residents below the poverty line, percentage of residences with vehicles, as other critical factors that could contribute to food deserts in the community where students lived. Students weighed these factors by using a scale from 0 to 40 to describe the severity of a food desert in the community. At the end of the lesson, students needed to create a Food Desert Index equation that could be used to determine the food desert scores in their community, and also can be used to standardize food desert problems in other urban areas. The educator, who developed the lesson, believed critical thinking and systems thinking are the core STEM knowledge that she wanted her students to practice in this lesson. She said, “My view of integrated STEM is not about teaching specific content. Instead of building subject-specific content knowledge, I think integrated STEM should focus on helping students use critical thinking to solve problems,” and “The problem needs to be meaningful to students. The boundary of each subject [STEM] is blurry, but each subject plays an important role to help students understand the problem and they are able to solve the problem by using [STEM] in a meaningful way.” As such, the educator’s perspective indicated she wanted students to learn transdisciplinary by solving a complex community-based problem (aka, food desert) using two disciplinary ways of thinking--mathematically modeling and systems thinking that were integrally interwoven and were simultaneously used to solve a complex problem such as food insecurity.

Conclusions and Discussion

Teachers' disciplinary ways of thinking play an important role in integrated STEM learning. Teachers are informed by their previous experiences, funds of knowledge, disciplinary identities, interests, and professional training (Ryu et al., 2019). These sources shape teachers' beliefs and thinking (Pajares, 1992). Because beliefs play a critical role in teacher education to support both preservice and practicing teachers' professional development, such as forming personalized teaching philosophy, motivating student learning, and developing effective pedagogical approaches (Pajares, 1992; Turner et al., 2009), it is important to consider how teachers' beliefs and disciplinary ways of thinking will shape how they design and implement integrated STEM learning experiences. Teacher educators should recognize the role beliefs and disciplinary ways of thinking play in the acquisition of knowledge as well as encourage reflection that brings beliefs to the level of conscious awareness to help improve teachers' classroom practices (Caudle & Moran, 2012; Lumpe et al., 2000). As such, teachers' disciplinary ways of thinking can help frame and focus integrated STEM curricula. For example, if the teacher uses their primary way of thinking to structure and facilitate a lesson, the learning experience will be more strongly anchored in a discipline and make connections with other disciplines. This experience is more likely to be a single discipline or multidisciplinary learning experience. In contrast, if a teacher uses multiple ways of thinking and purposefully structures and facilitates a lesson that engages students to use two or more ways of thinking in complementary or blended ways, then the lesson is likely to be an interdisciplinary or transdisciplinary learning experience.

A Broader and Developmental Approach to STEM Integration

Although content plays an important role in integrated STEM learning experiences, a more inclusive curricular and cross-disciplinary approach of academic and CTE subjects is needed to reach interdisciplinary and transdisciplinary levels of learning. It is important to consider several factors, not just the role of STEM content, to design and facilitate integrated STEM lessons, including: (1) the role of integration in learning objectives; (2) the role (i.e., presence and usage) of STEM concepts, content knowledge, and skills; (3) role of learning outcomes; (4) role of the instructor and type of instruction; (5) role of CTE content knowledge (e.g., AFNR); and, (6) role of students' thinking (Wang & Knobloch, 2018). We emphasize the role of students' thinking should play an important part of planning and facilitating integrated STEM learning experiences. Teachers and teacher educators should design integrated STEM lessons to engage students to think in disciplinary ways, whether it be predominately from a single discipline way of thinking or from a blending of two complementary disciplinary ways of thinking. Helping students see how disciplinary thinking helps them solve problems would encourage them to be more creative, critical, and multi-dimensional in finding solutions, especially for complex problems. Moreover, intersectionality of disciplinary ways of knowing will help students understand the nature of reasoning in disciplines other than their own as well as relations among STEM and CTE disciplines (Ryu et al., 2019), which would help develop multidisciplinary, interdisciplinary and transdisciplinary understandings.

Cross-disciplinary learning experiences should not be superficially regarded as content from different disciplines (Ryu et al., 2019), but as informed by different disciplinary thinking and epistemic characteristics that are exemplified by experts and professionals who were trained in the respective disciplines. A single disciplinary or multidisciplinary approach is a good starting point for teachers who wish to begin and develop their skills to design and facilitate

integrated STEM learning experiences. By doing so, students can explore how specific disciplines have a unique way of thinking and how they connect to other disciplines. We embrace that all disciplines can be a starting point for creating integrated STEM learning experiences, and it is not necessary for integrated STEM education to be inclusive of all S, T/E and M content areas. Developmentally, it may be better to transition multidisciplinary learning to interdisciplinary or transdisciplinary learning by focusing on two disciplines that have complementary ways of thinking or by blending the ways of thinking to solve a complex real-world problem. Contextualizing integrated STEM learning using real-world problems can help students understand how to solve problems using different disciplinary perspectives. We believe that an academic subject and a CTE subject can be used in complementary and blended ways thinking to help facilitate interdisciplinary or transdisciplinary learning experiences for students to experience the academic richness and rigor that comes when solving real-world problems that are complex, authentic, and relevant to students (Knobloch, 2003). Interdisciplinary and transdisciplinary learning experiences may be desirable among teachers who are interested in designing and facilitating integrated STEM learning experiences. However, we argue a continuum of different levels of integrated STEM learning can be used to scaffold integrated learning experiences for both teachers and students to develop their understanding and experiences of meaningful and integrated STEM learning (Wang & Knobloch, 2018, 2022).

The role of students' thinking can be reflected as a continuum of three different levels of STEM integration (Wang & Knobloch, 2018, 2022). First, *Exploring STEM* (Level 1) is when a teacher exposes students to one disciplinary way of thinking, but may see the possibility of another way of knowing upon completion of solving a complex problem. Second, *Developing STEM* (Level 2) is when a teacher has a predominant way of thinking that drives the instruction or problem-solving process, but engages students to use a secondary disciplinary way of knowing to introduce students to additional tasks that were part of completing the integrated STEM project. Finally, *Advancing STEM* (Level 3) is when a teacher intentionally and purposefully teaches students two ways of thinking that complement each other in meaningful ways to holistically solve a complex problem using higher-order thinking such as systems thinking, critical thinking, and/or creative thinking.

Integrated STEM learning has been growing and developing across many disciplines in the last 20 years. Because of this growth and interest among many disciplines, we believe the future of integrated STEM through AFNR is the means to interdisciplinary and transdisciplinary learning as educational professionals develop K-12 curricula and teacher professional development programs using complex real-world problems that drive what professionals in different disciplines are working on every day, and that students will work on in their future AFNR careers someday (USDA, 2015). By preparing students to learn how to solve complex problems in new interdisciplinary and transdisciplinary ways, we believe there are new solutions to improve the way teachers teach, students learn, and professionals collectively solve complex challenges in the 21st century. Bringing academic and CTE disciplines together in education will model how interdisciplinary and integrated teams in the workforce can solve complex real-world problems.

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Assessing the Effects of Virtual Cue Implementation in Virtual Reality Welding Training

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Incorporating virtual reality (VR) technology into training environments has proven effective because it allows training to remain safe, efficient, and meaningful. Welding training is no exception, with research exhibiting benefits such as decreased welder anxiety, increased cost- and time-efficiency, reduction in material usage, and advanced levels of skill acquisition. Our research aims to provide meaningful and experiential learning to beginner welders, equipping them with entry-level welding skills while identifying their professional development needs by employing various parameter cues using the Lincoln Electric VRTEX 360 Welding Simulator. This four-week study was completed at Texas State University and replicated three times. Undergraduate (N=108) students enrolled in Introduction to Agricultural Engineering, randomized into one of three sequence training groups, served as our participants. All participants performed single-pass 2F welds using the Gas Metal Arc Welding process. On average, results indicate the most difficult parameter to master was Travel Speed, while the most straightforward parameter was Contact-to-Workpiece-Distance. Assessing the three sequence training groups individually, we find that the Travel Speed parameter is consistently the most difficult to master, however, as participant welding experience increased, so did their welding parameter scores.

Introduction

Welding is a highly valued skill that requires advanced psychomotor dexterity, cognitive capacity, and kinesthetic proficiency. These skills have traditionally been developed through standardized welding training via agricultural mechanics courses, vocational/trade schools, and industry trainings (Bland-Williams, 2017). Welding training is typically comprised of safety lessons, machine and lab setup, equipment and materials knowledge, weld process techniques, and personal welding practice using the various processes and materials. Countless factors can affect a welders' ability to develop these complex skills like individual backgrounds or previously acquired knowledge and habits, making training a lengthy ordeal at times (Wells & Miller, 2020). These time-consuming trainings are also quite costly, due to the high material usage (e.g., electrodes, welding wire, steel, natural gas) and equipment requirements (e.g., torch tips, welding machines, grinders). These inherent issues, coupled with the 366,000 predicted welder deficit facing the industry by 2026, underpin the need for a more efficient method of welding training (American Welding Society, 2022).

A Technical Solution

A key solution for the welding industry has been realized in modern technology, specifically virtual reality (VR). Incorporating VR simulation technology in educational and career and technical education (CTE) environments, including various welding studies, has shown to be effective, specifically because it allows training of any kind to remain safe, efficient, and meaningful (Pantelidis, 1993; Shoulders & Myers, 2013; Whitney & Stephens, 2014). Effective VR systems revolve around three key components: (1) user immersion, (2) ability to navigate, and (3) ability to manipulate (Helsel, 1992). VR's exceptional interactivity has led to its heavy use across diverse educational settings (Pantelidis, 1993). This technology is used in

training methods for industries such as aviation, surgery, engineering, construction, and countless more (Bailenson et al., 2008; Whitney & Stephens, 2014). VR technology allows for computer-generated simulations to create virtual environments in which users experience and conduct various training tasks. Over the course of many years, simulations have become more advanced than researchers had initially imagined, resulting in the integration of VR technology into welding process trainings (Helsel, 1992; Virtual Reality Society, 2020). VR training simulations are customizable in that performance settings, grading parameter settings, physical environment, and user capacity can all be modified to personal or professional preference (Wells & Miller, 2020). Integration of VR welding training simulations has seen great benefits for beginning welders (Byrd et al., 2018). Within these VR welding training simulations, users are immersed into a virtual welding environment through use of Oculus headsets, real time audio generation, and 3-dimensional displays of the weld pool, metal workpiece, and weld gun (White et al., 2010). While offering exposure to advanced technology and unique training methods, VR technology also yields several added benefits, four of which will be considered in this paper.

Key Benefits to Virtual Reality Integration

One primary benefit to integrating VR technology into a welding training program is the provision of a safe learning environment for beginning welders (Whitney & Stephens, 2014). Learners that participate in traditional welding training are exposed to sparks, burning gas, metal fumes, and ultraviolet radiation. Many of these factors are concerning to inexperienced welders (American Welding Society, 2022). During VR training, all these events are simulated to the user virtually, rendering them safe from common dangers of traditional welding training (Whitney & Stephens, 2014). As VR offers an environment that is both safe and authentic to users, it is an ideal training platform for dangerous activities like welding training (Morozova, 2018). Not only does the virtual environment protect users from welding hazards, but it aids in maintaining anxiety levels for beginning welders as well. Being that welding is a task demanding advanced focus and skill, increased levels of anxiety are incredibly likely to affect weld quality and job performance (Byrd et al., 2015). A study utilizing VR weld process training revealed that anxiety levels directly affected the ability of welders to perform welds that pass visual inspections (Byrd et al., 2015). Removing stressors commonly found in traditional welding training equip VR training with the advantage of a less stressful learning environment, allowing for better concentration on welding skill development.

In addition to providing a safer alternative to its traditional counterpart, VR welding training has proven to be a more time and cost-efficient manner for training beginning welders (Dalto et al., 2010; Whitney & Stephens, 2014). VR welding simulators, such as the Lincoln Electric VRTEX 360, include software systems that afford straightforward, realistic set up tasks for users (Lincoln Electric, 2021). Traditional welding booths require that users initiate and prepare various gas tanks, welding tools, welding machines, gun attachments, and complete many other ancillary tasks. The VRTEX 360 allows users to complete all these actions within the virtual environment at a more efficient rate. VR welding training also allows for multi-user access, meaning multiple users may train on the machine at the same time using dual VR welding stations. Recent research found that this decrease in setup and breakdown time led to shorter required training times as groups using VR welding training required 2-3 hours less training time than those using traditional welding training (Whitney & Stephens, 2014). With less training time required for setup and breakdown tasks, paired with multi-user welding stations, more time can be devoted to increasing the learners' weld skill acquisition.

The third benefit realized in VR technology integration is that of material and cost savings. A study measuring the total amount and cost of materials “consumed” during a VR welding training compared the usage to that of a similar traditional welding training (Whitney & Stephens, 2014). Results demonstrate that the VR welding training required 33% less electrical energy than the traditional welding training, while also maintaining a high qualification rate for all weld types. Another study measured the cost of materials consumed by a group of welders trained using 50% VR and 50% traditional training, then compared it to a group of welders using 100% traditional training (Ref. 16). Researchers reported the group receiving both VR and traditional training consumed significantly less materials (e.g., steel flat plates, steel groove plates, and welding electrodes) than the traditional training group. The study reported a substantial savings of \$243.68 per student as a result of integrating VR welding training (Stone et al., 2011a). This significant reduction in training costs by means of material, energy, and equipment savings indicates that VR is a proven practical asset for welding training.

The final, and arguably most important, benefit of integrating VR technology into welding training is that it serves as a remarkable tool for the provision of meaningful experiential learning (Chan & Leijtaan, 2012; Shoulders & Myers, 2013). Administering meaningful learning is especially important for beginning learners in that it facilitates knowledge creation and retention. Additionally, experiential learning provides abstract conceptualization, reflective observation, and active experimentation, resulting in more concrete educational experiences for beginning learners (Shoulders & Myers, 2013). As users train in the virtual welding environment, they receive personalized feedback after every weld pass in the form of numerical parameter and overall weld scores. The VRTEX 360 tracks users’ performance as they weld, scoring their ability to maintain acceptable welding techniques. This allows users to improve their welding parameter techniques (work angle, travel angle, contact tip-to-workpiece-distance (CTWD), travel speed, and position) while also receiving direct instruction from teachers who observe the users via external monitors. Cheater lenses are also available for use in VR welding training which allow for an enhanced view and understanding of the weld process. Research reported significant improvements in both user engagement in the lesson and metacognition of beginning welders upon completion of VR welding training in which they received personalized feedback (Chan & Leijtaan, 2012). More recent research observed an increase in welder dexterity with the use of instant and accurate feedback from VR welding simulation training (Byrd et al., 2018). The same research also observed a faster rate of weld replication by implementing VR welding training. These faster replication rates allow for more welding practice, as well as more feedback personalized to their welding style. This increased volume of training paired with direct instructor feedback provides meaningful, experiential learning that will positively influence learners’ welding education and skill acquisition.

Theoretical Framework

The overarching framework of this study is guided largely by the skill acquisition theory. This theory explains that the development of skills occurs in three stages: declarative knowledge, procedural actions, and automaticity (DeKeyser, 2020). During the declarative stage, learners begin understanding the skills and steps required to complete a task, also called declarative knowledge (Wells & Miller, 2020). Next, the learner transforms their declarative knowledge into procedural knowledge by applying their basic understanding of a concept into action. This is through means of practice, targeting increased accuracy and time efficiency. With adequate practice, the learner is guided into the automaticity stage. A learner has reached automaticity

when they are able to alter their focus as they complete a task. These stages are present throughout all five levels of skill development which include beginning, advanced beginner, competence, proficiency, and expertise levels (DeKeyser, 2020). The goal of any effective training is to facilitate learners progressing from one level of skill to the next, in an efficient and meaningful manner. In this study, participants will enter the training as beginning welders and progress through the levels of skill development via virtual welding training.

Ausubel's assimilation theory also guided our study framework in that the main interest is to provide beginning welders with meaningful learning via weld process training. The assimilation theory explains that repetitious learning, for example traditional welding training, is less effective than meaningful learning in helping students develop their metacognition and self-regulated learning (Ausubel, 2012). Simply, repetitious learning alone is not enough to establish cognitive learning and thus retention of skills (Ausubel, 2012). Meaningful learning can be employed by providing three main variables: 1) an appropriate level of inclusiveness of relevant concepts to the task; 2) clear stability and cohesivity of concepts; and 3) distinguishability from the learning task. In this study, VR technology and training practices are utilized to enact meaningful learning. Meaningful learning is to be achieved by providing visual and audial cues within the virtual training environment, weld performance skill development, and sufficient skill practice time over the four-week span. This method of practice will reflect a new training style in that beginning welders will receive personalized feedback from both the VRTEX 360 welding simulator and the welding instructor. It will benefit learners by expediting and enhancing their skill acquisition, allowing them to adjust their performance according to the various feedback they receive and therefore experience meaningful learning situations.

Purpose and Objectives

This study aims to provide meaningful, experiential learning to beginning welders, equipping them with entry-level welding skills necessary to enter the welding industry. The purpose of the study is to identify the professional development needs of beginning welders by employing various parameter cues using the Lincoln Electric VRTEX 360 Welding Simulator. The VRTEX 360 measures welding skill performance by tracking five weld variables: 1) travel speed, 2) travel angle, 3) work angle, 4) contact tip-to-workpiece distance (CTWD), and 5) position. These scores are averaged to calculate the overall score of the weld (Lincoln Electric, 2021). Utilizing VR welding simulators, the main objectives of this study are to:

1. Identify participant travel speed scores with and without travel speed cue assistance
2. Identify participant position scores with and without position cue assistance
3. Identify participant travel angle scores with and without travel/work angle cue assistance
4. Identify participant work angle scores with and without travel/work angle cue assistance
5. Identify participant CTWD scores with and without CTWD cue assistance
6. Compare the parameter mean scores for the three sequence groups to determine if a significant difference exists

Methods and Procedures

Experimental Design

Our four-week descriptive study was conducted at [University] and replicated three times. Undergraduate students ($N = 108$) enrolled in the [course] during the Spring '21, Fall '21,

and Spring '22 semesters served as our participants. Upon approval from the Institutional Review Board, participants were asked to complete a paper-based demographics survey adapted from Wells and Miller (2020) including questions regarding age, gender, dominant hand use for both general activities and welding activities, and prior welding or VR experience. As this was a part of a larger study, a quasi-experimental design was applied in which participants were randomly assigned to one of three experimental sequence groups using a randomization formula in Excel. Each sequence group was then assigned a weld process training sequence to include VR, computer-based audio assisted (CBAA), and live weld process training (see Table 1). Due to the course schedule and randomization, 35 participants were assigned to Sequence Group One, 30 participants to Sequence Group Two, and 28 participants to Sequence Group Three.

Table 1

Weld Process Training Sequences for Virtual Reality (VR), Computer-Based Audio Assisted (CBAA), and Live Welding Training

Sequence Group	Weld Process Training for Week One	Weld Process Training for Week Two	Weld Process Training for Week Three
Sequence Group One	VR	CBAA	Live
Sequence Group Two	CBAA	Live	VR
Sequence Group Three	Live	VR	CBAA

Instrumentation

In order to achieve our research objectives, the VR welding training protocol developed for this study aimed to utilize the virtual welding parameter cues offered by the VRTEX 360 without overwhelming the participants. Therefore, the protocol employs one cue at a time, as opposed to multiple cues at once. The VR welding training took place in the Texas State Agricultural Mechanics' VR laboratory, outfitted with a dual-station VRTEX 360 VR welding simulator. To begin the VR welding training session, a 10-minute script-supported introduction to the VRTEX 360 was given by the researcher. The researcher explained the main components of the VRTEX 360 (oculus headset, welding gun, score screen, virtual weld coupon, and weld machine), how to set up the machine (selecting proper polarity, gas flow rate, wire-feed speed, and voltage), how to read and understand the visual/audial cues, and lastly how to perform welds in the VR environment. Following a brief virtual welding demonstration from the researcher, participants were then provided paper-based score sheets to collect their scores assigned by the VRTEX 360 for each of their weld passes. For the VR welding training session, participants were required to complete three rounds of the training protocol established for this study. One round includes five total weld passes. The first four weld passes are practice runs, each performed with different parameter cue assistance. The last weld pass is the test run, performed without cue assistance. Practice Weld One is performed using the Travel Speed cue, Practice Weld Two using the Position cue, Practice Weld Three using the Travel/Work Angle cue, and Practice Weld Four using the CTWD cue. The final Test Weld is performed without cue assistance, mimicking live welding. Table 2 displays the training protocol developed for the virtual welding training session.

Table 2

Virtual Welding Training Session Protocol

Weld Pass	Virtual Parameter Cue Employed
1. Practice Weld One	Travel Speed Cue
2. Practice Weld Two	Position/Aim Cue
3. Practice Weld Three	Travel/Work Angle Cue
4. Practice Weld Four	Contact To Workpiece Distance Cue
5. Test Weld	None

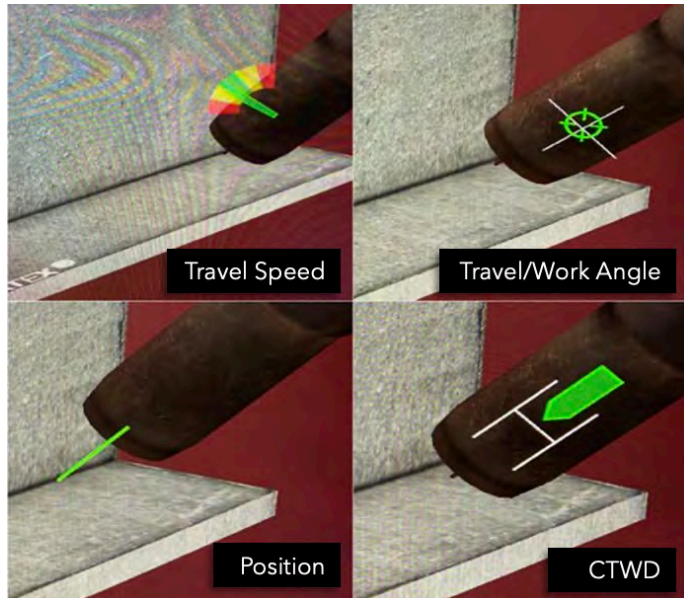
All virtual welding training sessions were scheduled to last the entire duration of the participants' lab period; approximately one hour and 40 minutes. However, some participant groups completed the training protocol 5-15 minutes early, though this was not determined as a limitation to the virtual training.

Virtual Parameter Cues

The visual and audial virtual parameter cues utilized in this research manifest in the virtual welding environment as gauges or icons, located at the tip of the user's weld gun. The Travel Speed cue measures the speed at which a user moves their weld gun across their workpiece, presenting as an arrow gauge. If the user's travel speed is too slow, the cue's arrow slides into the yellow or red zones, and if proper travel speed is maintained, the cue's arrow remains in the green zone. The Travel/Work Angle cue is a combined cue that measures the angles in which a user holds their weld gun. Presenting as a target that moves as users adjust their horizontal (travel) and vertical (work) angles, the cue is meant to be positioned directly in the crosshairs to maintain proper weld gun angles throughout the weld process. The Position/Aim cue is a colored aim line, indicating the exact aim of the weld gun. The goal of a 2F fillet weld is to fuse two pieces of metal together, therefore aiming directly at the joint is integral. A user maintaining proper aim at the joint of the weld will see a green aim line. If the user's aim drifts upward or downward, the cue line becomes yellow or red, indicating the need to reposition weld gun aim. Finally, the CTWD cue appears as a colored arrow that hovers above a barrier symbol. A user that holds their weld gun too close to the workpiece (causing weld puddle spatter) will see the arrow become red, directing the user to move farther away. A user that holds their weld gun too far from the workpiece (causing a disruption in the arc) will see the arrow become red, directing the user to move closer to the workpiece. CTWD is another elemental factor of welding as proper CTWD ensures effective weld penetration. All cues are displayed at the tip of the user's weld gun in the virtual environment. Visual representations of the parameter cues as they are displayed in the virtual welding environment of the VRTEX 360 are shown in Figure 1.

Figure 1

VRTEX 360 Virtual Parameter Cues



Virtual Weld Scoring

In this study, the parameter scores and overall weld scores for the virtual welds were determined by the VRTEX 360 virtual reality welding training simulator. The VRTEX 360 provides scores on a 100-point scale for each of the five welding parameters following the weld pass. Then the VRTEX 360 averages the five welding parameter scores to calculate an overall score for the weld pass. All weld scores are displayed on the score screen of the VRTEX 360. The participants were instructed to grade their weld on the VRTEX 360 score screen after the completion of their weld pass by pressing the “End Pass” button, prompting the system to grade the weld based on the five parameters previously stated. Participants then recorded their five parameter scores and their overall weld score for each of the five weld passes during Round 1, totaling 30 values per round. Following the completion of Round 1, participants then rotated using the VRTEX 360 with their peers to complete three total rounds of the virtual welding training protocol. Throughout the VR training session, participants were allowed and encouraged to observe each other, promoting the level of meaningful and peer learning in the training environment.

Results

Selected participant demographic data is displayed in Table 3 using frequencies and percentages of responses. A series of paired-samples t-tests were used to analyze mean parameter and overall weld scores for each round completed by study participants. Mean and overall weld scores for each sequence group were also analyzed and compared. This study collected demographic and welding experience data from 108 participants, 53 (49.1%) of which were

female, 51 (47.2%) were male, and 4 (3.8%) declined to answer or selected “other”. Most participants had never welded before ($f = 71$; 65.7%) and of the participants who had prior welding experience, the most common weld process used was SMAW ($f = 29$; 26.9%). Only three (2.8%) participants had prior welding simulator experience, and only two (1.9%) participants possessed welding certifications.

Table 3

Participant Demographics and Welding Experience (N = 108)

Item	<i>f</i>	%
Gender?		
Female	53	49.1
Male	51	47.2
Other	2	1.9
Chose Not to Answer	2	1.9
Dominant hand for most tasks?		
Right hand	92	85.2
Left hand	14	13.0
Chose Not to Answer	2	1.9
Dominant hand for welding?		
Right hand	96	88.9
Left hand	10	9.3
Chose Not to Answer	2	1.9
Academic grade level?		
Freshman	16	14.8
Sophomore	33	30.6
Junior	37	34.3
Senior	20	18.5
Chose Not to Answer	2	1.9
Previous welding experience?		
No	71	65.7
Yes	35	32.4
Chose Not to Answer	2	1.9
If you have welded before, which of the following processes have you performed?		
Shielded metal arc welding (SMAW; “Stick welding”)	29	26.9
Gas metal arc welding (GMAW; “MIG”; “wire welding”)	19	17.6
Oxy-fuel welding (OFW)	11	10.2
Flux-cored arc welding (FCAW)	4	3.7
Gas tungsten arc welding (GTAW)	4	3.7
Submerged arc welding (SAW)	1	0.9
Previous welding simulation / simulator system use?		
Yes	3	2.8
No	103	95.4
Chose Not to Answer	2	1.9
Achievement of a welding certification?		
Yes	2	1.9

No	104	96.3
Chose Not to Answer	2	1.9

Descriptive statistics of the parameter scores for participants ($n = 103$) during the VR welding training are presented in Table 4. Five participants did not fully complete the training; therefore, their data was excluded from this manuscript. Our results indicate that participants' parameter scores were higher when the virtual cues were off for all parameters but Travel Speed. All differences between parameter scores with and without cue assistance were statistically significant ($p < 0.05$).

Table 4

Total Participant VRTEX Welding Scores With and Without Parameter Cue Assistance ($n = 103$)

Parameter	Cue Assistance	Mean Score	SD	t	p
Travel Speed	On	78.19	20.56	2.26	0.02
	Off	75.53	16.89		
Position	On	90.07	16.89	-3.72	<0.001
	Off	94.56	15.04		
Travel Angle	On	87.76	18.76	-3.13	0.002
	Off	91.12	15.97		
Work Angle	On	88.55	22.00	-3.51	0.001
	Off	92.97	16.48		
Contact To Workpiece Distance	On	87.42	19.01	-9.38	<0.001
	Off	97.62	7.98		

As previously stated, the participants completed VR welding training by way of three different sequence groups. Sequence Group One, Two and Three data are presented in Table 5. Participants from Sequence Group One appeared to struggle the most with the Travel Speed parameter, with a mean score of 79.34 with cue assistance, and a mean score of 78.94 without cue assistance. Sequence Group Two participants, having one week worth of welding training at this point, struggled most with Travel Speed and Position, with a mean score of 72.58 and 80.61 without cue assistance, respectively. Sequence Group Three had received two weeks of welding training at this point, and struggled the most with the Travel Speed parameter, with an increased mean score of 83.93 with cue assistance and 78.8 without cue assistance. Participants in Sequence Group 3 continually scored an average of 90 and higher for all other weld parameters, with and without cue assistance.

“The lost boys”: A case study of male Agricultural Education teacher certification students who changed their career trajectories.

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Abstract

Agriculture teacher demand is at an all-time high due to program growth, expansion, retirements, and new program openings. However, the 2021 National Agricultural Education Supply and Demand Study indicates a shortage of highly qualified school-based ag educators. A particularly concerning trend is the decrease in males within agriculture teacher preparation programs; license-eligible ag teacher educator program completers were 76% female and 24% male in 2021. Utilizing Social Cognitive Career Theory (SCCT) as a theoretical framework, this case study describes male undergraduate students' decisions to depart from the agricultural education- teacher certification track at a Midwest land grant university. Findings suggest that male teacher certification students who leave the program a). sense they “don't fit in;” b). realize their interests do not fully align with teaching; c). feel concerns about self-efficacy; d). experience new opportunities in agriculture; and e). acknowledge financial concerns. Researchers recommend further research into the definitions and support systems of social value and influencers for male agricultural education students and their relation to self-confidence. Additionally, the profession should carefully consider meaningful employment opportunities which will support teacher certification students' opportunities to build knowledge and experience in the classroom earlier in their teacher preparation program.

Introduction/Theoretical Framework

The COVID pandemic exposed the cracks within an already stressed educational system. Teachers responded to challenges in alternative instruction, changing obligations, and shifting work and home routines, at the expense of their own well-being and job satisfaction (McKim & Sorensen, 2020). Persistent and unaddressed issues with teacher retention, low pay, tough school environments hurting teacher morale, and lack of support and professional development have created a “perfect storm” of teacher shortage (Garcia & Weiss, 2019). Recent studies have highlighted a growing concern for public education regarding the shortage of qualified teachers (Sutcher, 2019; Darling-Hammond & Carver-Thomas, 2016).

Nearly every state is reporting teacher shortages in certain subject areas, and many are hiring teachers who may not be fully certified (Sutcher et al., 2019). Agriculture teacher demand is at an all-time high due to program growth, expansion, retirements, and new program openings. In 2018, there were over 1,000 agricultural education positions left unfilled (Deimler et al., 2019). In addition to increased demand, the supply of teachers is dwindling. Since 2010, nationwide enrollment in teacher preparation programs has declined by more than 1/3, and the number of students completing teacher preparation has declined 28% (National Center for Education Statistics, 2019). Midwest state teacher preparation experienced a decline of nearly 35% in the number of preservice teachers in the past ten years.

Our biggest challenge to the agricultural education profession is preparing an adequate supply of high quality, appropriately certified educators (Eck & Edwards, 2019). Although teacher educators are facing unique challenges post-COVID, the teacher shortage is not a new issue: Teacher shortages in school-based agricultural education have existed since the Smith-Hughes Act was passed in 1917 (Hillison, 1987; Ingram et al., 2018). The 2021 National Agricultural Education Supply and Demand Study (Smith et al.) indicated a shortage of highly qualified school-based ag educators. 1 in 3 new agriculture teachers were entering the profession as uncertified or have not completed a traditional certification program (Smith et al., 2022). Nationwide, only 50 to 60% of graduates who are certified to teach agriculture choose to teach in their first year following graduation (Eck & Edwards, 2019).

An individual's choice to pursue a career in agricultural education is often rooted in their experiences in secondary agriculture education, their FFA/4-H experience, and on the advice of their advisors (Rice & Kitchel, 2015, Hendren & Tummons, 2017, Lawver & Torres, 2011, Pozderac et al., 2022, Saucier et al., 2010). Preservice teachers attribute their career choice to the support of the agriculture teacher and parents, a passion for agriculture, alignment with personal values/intrinsic value, and the influence of their agriculture teacher, FFA participation, self-efficacy, and opportunities opened through their agriculture experiences (Ingram et al., 2018, Solomonson et al., 2019). Preservice teachers view the education field as an enjoyable career; they seek opportunity to help in youth development and work with youth, wish to impact and serve others, seek advancement opportunities, salary, and benefits, and view teaching as a calling (Elfers et al., 2008; Harms & Knobloch, 2005; Kyriacou & Coulthard, 2000; Lawver & Torres, 2012; Thieman et al., 2014).

Preservice teachers identified potential concerns in choosing a teaching career including low salaries, long hours, self-adequacy, personal injury, and student discipline (Lawver & Torres, 2011, Paulsen et al., 2015, Stair et al., 2012, Tummons et al., 2017). Preservice teachers watch as their trusted mentors publicly struggle with unmet expectations and incompatibility with teaching agriculture and raising a family (Solomonson et al., 2019). Thieman et al. (2016) found that as boys progressed through high school, they became less likely to consider ag teaching careers. Preservice agriculture teachers have a intimate and personal preview of the joys and discomforts associated with their career choice in Agricultural Education.

A particularly concerning trend is the decrease in males within agriculture teacher preparation programs. Between 2010 and 2019, male enrollment in teacher preparation programs declined by 44 %, and in this Midwest state, 50% fewer males enrolled in teacher preparation programs during this time (Sutcher et al., 2019). Nationwide, license-eligible ag teacher educator program completers were 76% female and 24% male in 2021 (Smith et al. 2022). The discrepancy in male matriculants in teacher preparation are beginning to appear in the teacher demographics. The current teacher workforce is 77% female (Sutcher et al., 2019). In 2009, 71.0% of Midwest state agriculture teachers were male; whereas in 2023, males make up 51.5% of the teacher population (Saucier et al., 2010; Dietzschold, 2023). Among veteran agriculture teachers with more than 20 years of experience, male teachers in Midwest state outnumber females at a rate of 3:1. In stark contrast, female teachers with 5 or fewer years of experience outnumber their male counterparts by over a 2:1 margin (Dietzschold, 2023). One in

four agriculture teachers in Midwest state are female teachers with five or less years of experience, suggesting a shift in the demographics of the teachers within the profession.

While the shortage of male teachers is a recent phenomenon in Agricultural Education, the problem is more well-known in other subject disciplines. Studies suggest that the lack of male teachers may have adverse effects on male students' learning and development (Cushman, 2007; Deese, 2017; Martino, 2009; Moreau & Brownhill, 2017). Additionally, parents and educators believe that male teachers are needed to serve as disciplinarians (Carrington & McPhee, 2008; Moreau & Brownhill, 2017). School teacher has traditionally been considered a role for females, yet the demographics for agriculture teachers (and history of the FFA as a male organization) suggest a high proportion of male teacher influence. Contemporary discourse suggests the benefits of attempting to match the demographics of the faculty to those within their community (Cushman, 2007; Wasden et al., 2022).

The proportion of male students enrolling in teacher certification programs and completing their teaching certification continues to decrease. Based on the call for more research to “best determine a course of action” (Smith et al., 2017, p.3), researchers identified a gap in the literature regarding why so few male Agricultural Education majors complete their certification program to become an agriculture teacher. Researchers conducted a qualitative, descriptive case study to gain understanding about why males who enter college with the goal of becoming an agriculture teacher do not complete the teacher certification programs. This research can be used to consider ways to provide additional support for males working toward the goal of becoming an agriculture teacher.

Theoretical Framework

Social cognitive career theory (SCCT), which posits that individuals are products of their surroundings, and their surroundings are products of their interactions-serves as the theoretical framework for this research. The basic building blocks of SCCT are self-efficacy beliefs, outcome expectations, and goals (Lent et al., 1994). Self-efficacy beliefs refer to people's thoughts about their capabilities to plan and execute necessary steps to reach their goals. Outcome expectations refer to perceived outcomes or consequences of an individual's behavior. Goals help organize and direct behaviors as individuals make progress and are influenced by people's self-efficacy beliefs and outcome expectations.

Specifically, we focus on SCCT's Choice Model (Lent, 2013). The SCCT choice model purports that making a career choice is not a one-time occurrence, but an ongoing set of processes. Over time, certain choices become more appealing due to personal beliefs about self-efficacy, perceived outcomes, and personal goals. Individuals tend to pursue outcomes they perceive as achievable and interesting. The three components essential to making a career choice include a). expression of a primary choice to enter a field; b). taking actions to pursue that goal; and c). performance experiences, or the feedback loop. The choice process is heavily influenced by an individual's environment and opportunities. People with similar backgrounds, interests, belief systems, and outcome expectations tend to select similar outcomes.

Research is needed to understand why males who have been recruited into agricultural education-teacher certification programs decide to change degree programs instead of completing their original career plans. Insight gained from this research may guide policy makers, administrators, advisors, and educators in supporting male ag teacher candidates to persist throughout their agricultural education-teacher certification program. It is our hope that gaining insight into this situation will help address the nation's agriculture teacher shortage.

Purpose(s)/Objective(s)

The purpose of this case study research was to describe male undergraduate students' decisions to depart from the agricultural education- teacher certification track at the University of Midwest state. Specifically, we were interested in understanding:

- 1.) What barriers and supports do undergraduate male teacher-certification students experience during career decision making?
- 2). What are undergraduate male teacher-certification students' perceptions about their self-efficacy to teach agriculture?

This research addresses the American Association for Agricultural Education Research Agenda Research Priority 3: *Sufficient scientific and Professional Workforce that Addresses the Challenges of the 21st Century*. Specifically, it provides insight into Research Question 2: *What methods, models, and practices are effective in recruiting agricultural leadership, education and communication practitioners and supporting their success at all stages of their careers?* (Roberts et al., 2016). Narratives from this bounded system will be valuable in helping educators and administrators gain understanding about male students' decisions to leave the path to become an agriculture teacher. Insights into this situation could be useful in addressing the nationwide teacher recruitment and retention issues we face (Ingram et al., 2018).

Methods/Procedures

This qualitative research used an instrumental case study design (Stake, 2005) to describe male undergraduate students' decisions to discontinue on the agricultural education- teacher certification track at the University of Midwest state. Researchers utilized a constructivist interpretive framework, assuming that meaning for individuals is constructed through their interactions with others, the world around them, and how they interpret those interactions (Berger & Luckman, 1966). Two author-researchers are faculty members in Agricultural Education at a Midwest state university who previously taught in high school classrooms, and the third is currently a high school agriculture teacher. She graduated from the Agricultural Education-Teacher certification program at the University of Midwest state and conducted this research project during her senior year.

Research Design

Instrumental case studies focus on a specific concern and select one bounded case to illustrate the issue (Creswell & Poth, 2018). We used the bounded system of the University of

Midwest state Agricultural Education-Teacher Certification program to describe the issue of males entering with the intention to become ag teachers but not completing certification. This case was selected to help us gain insight on why there are so many males graduating from agriculture teacher certification programs. Focusing on the case at University of Midwest state is appropriate because data shows that retaining males in the teacher certification program is a challenge. Additionally, our existing connections with male students who had attended this institution meant that participants were accessible for interviews.

Prior to data collection, researchers sought and received approval for this project by the local Institutional Review Board (IRB). With the goal of developing an information-rich case study, we used criterion-based selection (Merriam, 2009) to identify male undergraduates who entered but chose to discontinue the teacher certification program between 2014 and 2018. An additional criterion of this purposive strategy required that participants complete their degree at the university after switching their major. Six males consented to participate in this research, which was conducted over a one-year period.

Data Sources and Collection

We used individual interviews, a photo elicitation activity, and document analysis to promote rigorous research with rich, transferable findings.

Interviews

Since our participants were scattered across the country, semi-structured interviews were recorded via zoom, phone, or face-to-face at the participant's convenience and transcribed verbatim. Open-ended interview questions were used flexibly, with no predetermined order (Merriam, 2009). Interviews consisted of questions about participants' background information, experiences, values, and knowledge (Patton, 2002). Interviews with each of the six participants lasted between 45 and 60 minutes. We also conducted a 30-minute follow-up interview with two participants to clarify lingering questions.

Photo Elicitation Activity

Photo elicitation is based on the idea of including a photograph in a research interview (Harper, 2002). We selected three photographs from our program's photo library that depicted three different tasks teachers of agriculture might engage in: a). teaching in a classroom; b). dealing with a fire in a shop; and c). assisting at a livestock show. As their semi-structured individual interview concluded, each participant was given this prompt, "*When you look at this picture, what comes to mind?*" When necessary, we asked follow-up questions about participants' confidence and capability to perform each task. Photographs can help to provide insight into participants' experiences, beliefs, values, and feelings (Harper, 2002).

Document Analysis of Facebook posts

Documents appropriate for analysis include written, visual and physical materials that help inform a researcher's work (Merriam, 2009). Documents for this study included each of the six participants' individual Facebook pages from 2010-2022. We viewed these years to help us understand participants' formative years of career decision making as well as their careers and interests today. While analysis of documents such as Facebook pages may be incomplete or

inaccurate (Creswell & Poth, 2018), viewing participants' agriculture and FFA involvement on social media helped us confirm information or point out discrepancies that they provided to us in their interviews.

Data Analysis

We analyzed interviews, photo elicitation, and Facebook posts using Glaser & Strauss' (1967) constant comparative method, as recommended by Merriam (2009) for case study research. Data analysis is the process of consolidating, reducing, and interpreting to make data meaningful (Merriam, 2009). First, we open coded the data, selecting segments or units of information that were related to the research questions. Next, we compared these codes with others in the research set, sorting the codes into tentative categories. These categories were informed by the study's purpose, our own knowledge as teachers and researchers, existing literature, and the meanings that were communicated by the participants (Merriam, 2009). Finally, the categories were condensed into five exhaustive and mutually exclusive themes.

Credibility and Trustworthiness

Multiple investigators, sources of data, and data collection methods provided triangulation, promoting the credibility and trustworthiness of this research. In addition to recording field notes and reflective memos, we engaged in peer debriefing throughout all phases of this research. Finally, the use of rich, thick description and an audit trail adds to the trustworthiness of this research (Merriam, 2009).

Findings

Description of the Case

The University of Midwest state has an Agricultural Education degree program housed in the College of Agriculture, Food and Natural Resources. Students pursuing this degree program can choose between two tracks: Teacher Certification or Leadership and Communications. Between 2014 and 2018, [UNIVERSITY] had an average of 12.4 students completing the Agricultural Education teacher certification program each year. Seventy percent of the students were female, where 30% identified as male.

This case study research includes six male students who entered the Agricultural Education program at the University of Midwest state between with the goal of becoming high school agriculture teachers. All six participants changed career plans and discontinued the teacher certification program before graduating from the university. However, after a year outside of the program, one participant (Thomas) came back to Agricultural Education-teacher certification track once again. Figure 1 depicts the participants, their earned degrees, and their current careers. As of today, all have graduated with degrees in Agricultural Education from the University of Midwest state and are either employed in an agricultural career or pursuing a graduate degree in an agricultural discipline.

Figure 1. Participants

Participant	Degree Earned	Current Career
Justin	B.S. Agricultural Education	Farmer (with father-in-law)
Austin	B.S. Agricultural Education	General Manager at an agricultural cooperative
Ross	B.S. Agricultural Education	Master's student in a college of agriculture
Devon	B.S. Agricultural Education	Territory Manager for an agricultural company
Mark	B.S. Agricultural Education	Master's student in a college of agriculture
Thomas	B.S. Agricultural Education	High school agriculture teacher

Five themes emerged from individual interviews, photo elicitation activity, and analysis of participants' social media pages. Themes included: a). Sensing they “don’t fit in;” b). Realizing their interests do not fully align with teaching; c). Feeling concerns about self-efficacy; d). Experiencing new opportunities in agriculture; and e). Acknowledging financial concerns. These themes provide insight about male undergraduate teacher-certification students’ decisions to change career paths at the University of Midwest state.

Theme 1: Sensing they “don’t fit in”

Overwhelmingly, participants felt like they “*didn’t fit in*” the agricultural education-teacher certification program. Although these words were spoken repeatedly during interviews, this looked slightly different for each participant.

Austin explained,

My first year I had to take some entry level teacher certification classes in the education school. You know, to me I guess... I didn't quite fit there. In the education courses, it's a little bit different crowd than the Ag industry.

Justin explained,

You kind of get your fill at the time there in courses in the college of education. I immediately realized that I did not enjoy this course at all. I'm not like him [the teacher]. The Ag Systems Management side as well as the Plant Science side was much better fit for myself. So because of those education courses I was not very excited to keep continuing. My interest quickly drew to the other areas.

To Thomas, who was raised on a row crop and cattle farm and returns home to work on the farm most weekends, not fitting in felt different. He felt like there were not enough males in agricultural education for him to fit in. He explained,

There's just... it's a lot of females in Ag Ed and stuff like that. But in Ag Systems, there's a lot of guys. And we click a lot better. We have a lot more in common... we can sit down talk about farming for an 8-hour day.

Mark, who identifies as gay, shared that he experienced many challenges with fitting into FFA as a high school student. He explained that he has also felt like he does not fit in as a college student at times either. He commented, “*I've definitely had experiences where I have not felt comfortable in the college.*”

Theme 2: Realizing their interests do not fully align with teaching

Some of the participants entered the teacher certification with a deep interest in agriculture and desired to share that knowledge with others. However, over time they began to feel that wasn't enough of a reason to teach.

Austin explained,

At the time I came to the program I obviously was interested in agriculture..., and I liked the idea of teaching kids. But you know the further I got into the semester in the teacher ed course, I don't know...I lost interest may be the word. Or maybe just, you know, kind of got more involved in the agriculture department and eventually made that made the decision then that I should focus on ag content itself, not necessarily the teacher certification part.

Austin went on to explain that he especially enjoyed his Animal Science classes, which made sense to him since he had always raised cattle. Similarly, Justin realized that he was more interested in learning about Plant Science and Ag Systems management at a deeper level. Other participants had entered college with extensive leadership experience or the desire to work with students in that area. Over time, they realized there was more to being an agriculture teacher than the FFA aspect.

Devon explained,

Once I got further into my classes you know... started taking some of the courses about high school students, I was like... ahh I don't know if this is for me basically. I just remember... like the record book class with Mr. Hoover. We learned about record books and I really enjoyed record books. But I was like.... ugh! Trying to teach this to high schoolers could be really difficult I bet. So deep down I knew. I kind of like suppressed it I guess you could say, because I was... I'm all about this FFA aspect...competing, traveling, and things like that.

Ross noted he most enjoyed the leadership aspect of agricultural education. However, he believes as an ag teacher it is important to have a balanced three circle model. He explained, *I don't want to sound shallow...but I'm not sure if I would have connected with every student equally. I probably would have connected more with students who were into FFA than all ag students. I feel as though that would be kind of... a disservice to all students in the classroom if I was like... super partial in that way. I was definitely more interested in the FFA part of being an ag teacher than the classroom part.* Ross admitted, *"If my program was balanced, I don't think that I would be having as much fun as I would be in another career.*

Justin explained that he entered the teacher certification program thinking teaching was about training contest teams, which had been an emphasis in his high school. After learning more about the teaching career, he began to understand that classroom teaching is a key piece of the three-circle model. Justin stated,

If I'm honest with myself, if I was to be a teacher... at some point I'd either get burned out or not be able to do that well. If FFA is my main reason of being an ag advisor, then maybe this isn't the best fit for me.

Ross reiterated,
I remember it was the lesson teaching experience...when I realized the day-to-day high school teacher job wasn't going to be enjoyable to me. It was a realization that I hadn't really understood the type of work that happens daily outside of the classroom in preparation for the classroom. I didn't realize how much of a commitment that was.

Theme 3: Feeling concerns about self-efficacy

Several participants expressed concerns about their competence in many different areas. These included social competencies, technical skills and agricultural knowledge.

Mark expressed concerns about his ability to work with people as an agriculture teacher. He explained, *"I don't think honestly I could deal with high school kids, middle school kids and also the parents. So, I guess that's why I kind of fell out of it."* He also talked about feeling completely unprepared to teach shop, even though he had been enrolled in shop classes as a high school student. Mark explained, *"Honestly, I was never involved in shop. I got out of doing shop things because I wrote speeches. Um, so I was...I never got to actually experience shop."*

During the photo elicitation activity, several students who said they had been focused on leadership developing throughout FFA expressed concerns about their self-efficacy to help students with livestock projects. Ross and Mark both talked about having no livestock experience. Ross said that he would probably be *"proud of his students"* who exhibited livestock but felt he did not have the knowledge or skills needed to guide or advise them. Mark had a similar attitude, saying that cattle put him *"out of his comfort zone"*. He added, *"I'm not a livestock kind of person."* Justin expressed similar concerns, saying that he had never been around livestock.

Facebook posts revealed that several of the participants had a great amount of experience with livestock or equipment during their high school and college years, while others seemed to be fully engaged in the leadership aspect of FFA. This data helped confirm conversations with participants during their individual interviews.

Theme 4: Experiencing new opportunities in agriculture

Participants were impacted by high school and college jobs and internships in agriculture while they were making decisions about their career choices. In many cases, they accepted opportunities in fields highly related to these proximal influences. Facebook posts depicted some of the relationships with bosses or other employees during these employment opportunities.

Austin began working at an agricultural cooperative during high school and continued throughout his college years. Throughout those years, he grew close to his boss and saw him as a mentor. As Austin became familiar with and knowledgeable about this kind of work, he began to see it as a career option. Today, he manages an agricultural cooperative.

Similarly, Ross held a job with a curriculum development company throughout college. He explained,

Yeah, they've been really good about it. Like... I get to at work on a project because I'm interested in it. They'll find a way to include me; I'm meeting somebody once every two

weeks to talk about like... what I'd like to learn more about, what I'd like to stop doing. I feel like especially there...they've been super supportive.

He added that he could see himself in that type of work upon the completion of his master's degree.

Mark, who was involved in a science-based SAE during high school and worked in a Research Lab as an undergraduate, began to see a future in this field. He is currently pursuing a Master's degree and is heavily focused on research. Justin, who is currently farming, had the opportunity to work at the university research farms throughout high school and college and found out he really enjoyed tractor work.

Ironically, Thomas' summer internship was a proximal influence that prompted him to return to teacher certification after a change of major that lasted for one year. Thomas explained, *"I interned with [an agriculture cooperative] and I really enjoyed it. But I was working all hours...whenever the weather was good we were running."* Thomas' internship outside of agricultural education reminded him people in other career fields also invest long hours.

Theme 5: Acknowledging financial concerns

Each of the participants mentioned financial concerns about the teaching profession. Austin explained, *"First off it's hard to ignore the job market for educators right now, especially in the state of Midwest state. Thinking about salary benefits, things like that... so that was something that was always tolling on my mind."*

Devon, whose mother had been a teacher, explained:

My parents, they were a huge support...my mom and I are really close. At the end of the day she was going to be happy with whatever I ended up doing. But you know, she kinda at the same time I guess, kind of influenced my decision. She kinda helped me open up my mind I guess... to other career opportunities outside of education. She was in education, so she kind of has that influence as well. She's been involved in the retired teachers association, so she kind of I guess had an insider view of things with education...and how, you know funding keeps getting cut for schools and you know that retirement program they keep trying to take their money as well.

Thomas, who left the teacher certification path to pursue a degree in Agriculture and returned to his original plans one year later, also had concerns about teacher salaries. When asked why he made the decision to return to the teacher certification program he explained:

I got to evaluating what I enjoyed and job availability back home where our farm is. I realized teaching would allow me to still farm. I could still check cows after school, I would be close to home...and I would be doing what I love. I gave myself permission to put enjoyment over dollars. It's hard because money makes the world go round, so it's hard not to chase it.

Conclusions, Recommendations, and Implications

Conclusions

While case study research focuses on a bounded system and does not allow us to generalize (Merriam, 2009), much can be learned from this case and potentially transferred to a new situation (Erickson, 1986). To fully address the decline in male teachers, organizations must identify the underlining causes or reasons why men are not entering the teaching profession (Cushman, 2007). Factors that have been identified as deterring men from entering the field of education include teacher salaries, workload and social status (Cushman, 2007). This research, which focuses specifically on agricultural education, adds to the body of work that explores why males are not entering the teaching profession. Interviews, document analysis, and observations support Cushman's findings that teacher salaries, workload, and social status deter males from choosing to be teachers.

However, this research suggests that males' decisions not to teach are also influenced by other opportunities made known and available to them in the field of agriculture, a lack of confidence about their own knowledge, skills and abilities, and a general sense that they do not fit in with others pursuing the degree. Ingram, Sorensen, Warnick, & Lawver (2018) reported social influencers and social values as key motivators in choosing to major in agricultural education. Our research supports this study by illustrating how male students perceived and processed lack of social support and not feeling a fit in their decision to leave teacher education.

Related to the issues of fit and support were how the waves of peer interactions, field experiences, and classwork eroded students' notions of the actual tasks of being an agriculture teacher in a complete program. The more the participants gained perspective beyond their own narrow experience, the less confident they felt in their abilities and decisions. The expectations of creating both an idealized version of a quality Agricultural Education program and a functional work-life balance (Solomonson et al., 2019) weighed heavily on participants. Could our well-intentioned efforts be unintentionally lowering students' self-confidence to a point where they are deserting their career goals?

Recommendations

Researchers recommend further research into the definitions and support systems of social value and influencers for male agricultural education students and their relation to self-confidence. What are the experiences of male students in college of education courses when interacting with preservice teachers and faculty within other certification areas? Researchers should further investigate the internal and external career and financial pressures of rural male students in colleges of agriculture.

Preservice teachers should carefully consider the expectations placed on male students within educational coursework and encourage students to engage in extracurricular activities which build social value and self-confidence among students. Additional research is needed to determine to what extent male teacher certification persistence is problematic in other universities and in other states; we do acknowledge that the themes in this research may potentially be unique to this case. Additionally, this research brought to light that occasionally males who leave the teacher certification track may return to the teacher education program.

Research should be conducted to explore to what extent males who leave the teacher certification track re-enter at a later point through a non-traditional pathway. Finally, research is needed to explore the phenomenon of male teacher certification students who complete their degree programs but never teach in the high school classroom.

Implications

Findings suggest that proximal influences during times when male students are making decisions about careers are particularly important; many of the participants in this study landed in full-time careers that were initiated by their internships or part-time jobs. One challenge facing teacher education programs may be the limited internship opportunities that specifically translate into practical experience and knowledge needed to teach agriculture. Social cognitive career theory emphasizes that contextual supports promote learning experiences and impact self-efficacy (Lent et al., 2002). While a student pursuing another career pathway may be involved in a full-time internship with a company as early as the summer of their freshman year of college, teacher certification students do not experience significant work in their specific pathway until student teaching. The profession should carefully consider meaningful employment opportunities that will support teacher certification students' opportunities to build knowledge and experience in the classroom earlier in their teacher prep program. On a policy/systems level, how can agricultural education provide more hands-on engagement opportunities for male teacher prep students to work with younger learners or assist in a classroom earlier in their college careers?

Preservice programs can provide opportunities for preservice teachers to interact with students and assist with teaching earlier in the teacher prep program to address challenges with teaching self-efficacy, which several participants indicated was a concern for them. However, several participants also expressed concern about their self-efficacy in content areas such as shop and livestock handling, even when they have taken classes in these areas in high school. It is unreasonable to expect preservice students to have knowledge in all agricultural fields, but these findings should raise an alarm for the profession. Participants reported taking high school agricultural mechanics classes, but instead of working in the laboratory, they were spending class time writing and practicing speeches. Are students truly taking away the knowledge and skills they need from their high school ag classes? Are there additional content knowledge expectations are lumped onto male students? Why do preservice content and education course expectations and content differ so greatly from the expectations generated by preservice teachers through their high school experiences? All these questions beg for deeper exploration.

Finally, participants identified concerns about teaching salary and parent perceptions as barriers to completing a teaching career. Although these perspectives are certainly not new, perhaps the "*not fitting in*" theme is a bit more troublesome and surprising to the profession. It is ironic that students who spend their high school days focusing on leadership activities do not feel like they fit into teacher certification programs, and neither do the students who focus only on ag content! As the agricultural education profession continues to address teacher retention, perhaps it is time for more discussion on how to refocus and reprioritize the three-circle model.

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Investigating the Effects of Cognitive Style on Course Motivation for Students' Enrolled in a Team-Based Learning Formatted Introductory Agricultural Mechanics Course at Louisiana State University

Abstract

In today's classroom educators have a plethora of teaching methods at their fingertips, which allows them to be able to tailor the learning environment to meet students' needs. To meet those demands, flipped classroom have become a popular approach to move into a student-centered learning environment. Of those types of flipped classrooms, Team-based learning provides the students with the opportunity to learn content knowledge outside of classroom time and spend more time doing hands-on activities in a laboratory environment. The purpose of this study was to describe the effect cognitive style had on course motivation of undergraduate students enrolled in an introductory agricultural mechanics course at Louisiana State University. In order to test the hypothesis, descriptive statistics, including mean, frequency, and standard deviation were utilized to gain a holistic understanding of the data. A Mann-Whitney U test was employed to determine if a statistically significant difference existed between course motivation and cognitive style. Overall, no statistically significant differences were found between cognitive style and course motivation. However, of all participants, the more innovative individuals had higher course motivation scores than more adaptive individuals.

Introduction

In recent years, it has become increasingly more important for educators to adapt to new pedagogies to develop higher-order thinking skills for their students to meet the demands of the current workforce (Fuhrmann & Grasha, 1983; Jonassen, 2000; Ulmer & Torres, 2007). Due to the highly structured components of the workplace today, skills associated with problem solving, or critical thinking, have become highly desired (Eisner, 2010; Gokhale, 1995; Garcia-Perez et al., 2021) because employers want individuals who can find, identify, and solve complex problems in an effective and efficient manner (Johnson, 1991; Rodriguez-Sabiote et al., 2022; Van der Zanden et al., 2018). However, it has been noted that students today do not solve meaningful problems as a part of their curricula to enhance problem-solving skills (Jonassen, 2000).

A common type of problem solving that can be encountered in our everyday lives revolves around the ability to troubleshoot problems. Troubleshooting, as defined by Herren (2015), is determining what causes a malfunction in machine or process. Further, Custer (1995) and Jonassen (2000) added that troubleshooting also includes a subset of problems, where the problem is situated into a real-world context. These problems are often integrated into our daily lives and are ill-structured in nature, which means they are defined by a single domain and often their solutions are undefined. They often require the learner to integrate multiple domains to achieve the solution (Jonassen, 2000). These ill-structured problems require the troubleshooter to possess knowledge, skill, and multiple experiences to interact effectively with the complex system they are troubleshooting (Johnson & Fleshner, 1993; Jonassen, 2003). Also, according to Halpern (1984), the most important piece to effective problem solving is the troubleshooter's ability to recognize and select the most appropriate solution. However, it has also been found

that the path to deriving a solution between novice and expert troubleshooters is often quite different (Pate et al., 2004).

Prior research has been conducted to understand the differences between novice and expert troubleshooters. Dixon and Johnson (2011) found that expert troubleshooters constructed five better mental schemas of the troubleshooting task, which can be linked to better metacognitive skills. Whereas novices had a more challenging time troubleshooting because of a lack of mental schemas (Dixon & Johnson, 2011; Gitomer, 1988). However, this finding could be linked to less experience and knowledge, which hinders a novice from successfully troubleshooting. Nevertheless, it has been reported that a main difference in troubleshooting ability among expert and novice troubleshooters were attributed to the plethora of information received and acquired in a specific domain (Johnson, 1989).

Research has focused on the influence of cognitive styles, specifically its influence on decision making (Witkin et al., 1977). Blackburn et al. (2014) sought to assess the effects cognitive style and problem complexity had on the problem-solving ability of undergraduate students. The results of this study indicated there were no statistically significant differences in the problem-solving ability of the more innovative individuals when solving a simple or complex problem. Further, Blackburn et al. (2016) assessed the troubleshooting ability of undergraduate students based on cognitive style, problem complexity, and hypothesis generation ability. Also, a similar study found that cognitive style grouping does have an effect on overall problem-solving ability in terms of time to solution and hypothesis generation ability (Figland et al, 2021). Much like Blackburn et al. (2014), cognitive style was determined prior to any treatment or intervention. However, the results of this study indicated regardless of problem complexity, students who generated the correct hypothesis were more efficient problem solvers.

Within agricultural education, problem solving and critical thinking skills have been commonly taught through the problem solving approach to teaching and learning (Phipps & Osborne, 1988). For many years, the problem-solving approach has been considered the best method of instruction in agriculture (Phipps & Osborne, 1988) because school-based agricultural education (SBAE) programs have become an optimal place to assist students in developing and refining problem solving and higher order thinking skills (Pate & Miller, 2011a). However, educators generally do not teach an ample number of problem-solving skills in their curriculum (Pate & Miller, 2011b), which could be compounded by the teacher's lack of knowledge on how to effectively implement a new teaching strategy to foster problem solving skills development (Jonassen, 2000; Ulmer & Torres, 2007).

To combat the lack of skills, educators have begun to incorporate more innovative teaching methods like flipped classrooms into their pedagogy (Figland et al., 2019). The first flipped classrooms emerged in the early 2000's (Frederickson et al., 2005; U.S. Department of Education, 2001; Strayer, 2007). This type of learning platform allows students to take command of their own learning outside of classroom and educators time to facilitate meaningful interactive learning experiences during class time (Lage et al., 2013). Team-Based Learning (TBL) is an modified version of the flipped classroom concept that primarily uses a student-centered approach and shifts instruction from a traditional lecture format (Artz et al., 2016; Nieder et al., 2005). Essentially, TBL allows the learner to take on the responsibility of learning the conceptual

knowledge outside of class time and focus on the procedural knowledge in class (Michealsen & Sweet, 2008). In this format, students are able to develop problem-solving and critical thinking skills by being provided the ability to solve real-world application exercises ([Figland et al., 2019).

Even though TBL emerged in the 1970's, research supporting its use and effectiveness has been rather few and far between, especially in agricultural education. However, recent research on the use of TBL has been conducted. McCubbins et al. (2016) conducted a study to examine student perceptions of TBL in a capstone course. The findings suggested that students had a positive outlook of TBL and were highly satisfied with the learning environment (McCubbins et al., 2016). The results from this study also indicated that working in groups had a positive impact on students' motivation to work and learn in a collaborative environment (McCubbins et al., 2016). Similarly, McCubbins et al. (2018) conducted a study to assess student engagement in a TBL formatted course and found that TBL supported students critical thinking, motivation to learn, and ability to effectively apply course concepts. Further, Figland et al. (2019) reported that students were highly satisfied with a TBL formatted agricultural mechanic's course. These students perceived that TBL supported the development of critical thinking skills, created positive collaboration between group members, and increased individual self-efficacy in agricultural mechanics (Figland et al., 2019).

It has also become apparent that awareness of a student's cognitive style is a crucial factor in the overall success of the individuals' ability to solve problems (Jonassen, 2000). Broadly, cognitive style can be defined as an individuals' preferred way of going about organizing and retaining information to solve problems (Keefe, 1979; Kirton, 2003). However, it should be noted that individuals vary in their preferred cognitive style which can influence a person's pattern of thinking and reasoning (Kirton, 2003; Jonassen, 2000). For quite some time, research has focused on the influences that cognitive styles has on teaching and learning, specifically its influence on the decision making process (Witkin et al., 1977). Educational literature overwhelmingly conveys the importance of cognitive styles of individuals as an important function of their everyday life (Witkin et al., 1977; Thomas, 1992; Torres & Cano, 1995; Parr & Edwards, 2004; Myers & Dyer, 2006). Therefore, the questions arises: Does cognitive style effect course motivation of students enrolled in a TBL formatted course in agricultural mechanics?

Purpose and Objectives

The purpose of this study was to determine the effect of cognitive style on course motivation of students enrolled in an introductory agricultural mechanic's course at Louisiana State University. This research supports the American Association of Agricultural Education's National Research Agenda Priority 4: *Meaningful, Engaged Learning in All Environments*. Specifically, this research addresses question three, "How can delivery of educational programs in agriculture continually evolve to meets the needs and interests of students?" (Edgar et al., 2016).

The following null hypotheses guided this study:

H₀1: There are no statistically significant differences in course motivation based on cognitive style for students enrolled in an introductory agricultural mechanic's course.

Theoretical Framework

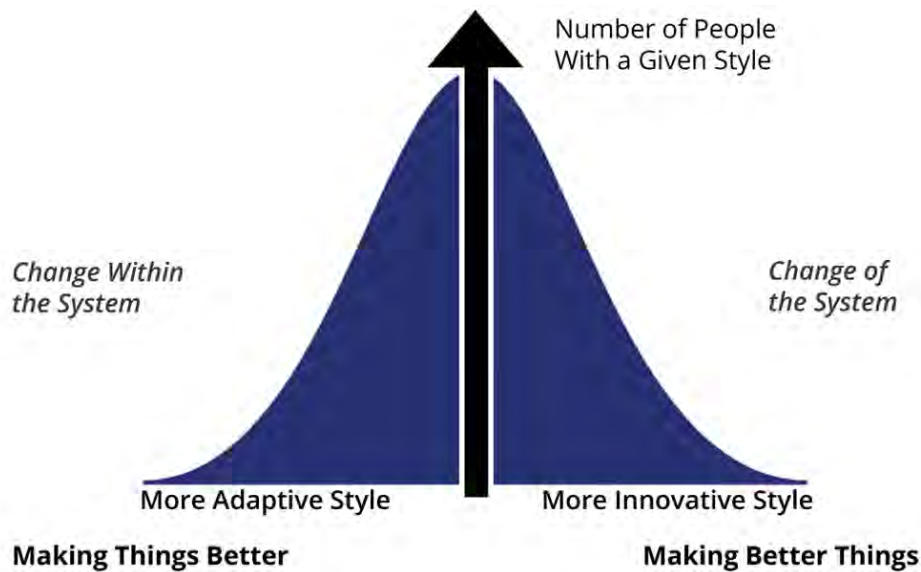
The theoretical framework used for this study was Kirton's (2003) Adaptation-innovation theory (A-I theory). According to Kirton (2003) cognitive style is "the preferred way to which people responds to and seek to bring about change" (p. 43). Therefore, the result describes differences regarding the problem solving and cognitive styles between individuals. The A-I theory is founded on the belief that every individual is creative and can solve problems, whether they be simple or complex (Kirton, 2003).

Further, A-I theory presumes individual cognitive style is predetermined from the initial stages of life and remains stable, regardless of previous factors. However, A-I theory is only a measure of cognitive style that examines problem solving on an individual basis (Kirton, 2003). Therefore, this theory is concerned with the influence of individual cognitive style and preferred mode to learn. It is also important to note, that the term *preferred* relates to the difference between an individual's style and behavior and the term *style* indicates a distinction between individual style and the level of cognitive capacity (Kirton, 2003).

When examined through a lens of A-I theory, individual cognitive style falls between adaptation and innovation on a continuum (Kirton, 2003; see Figure 1). Therefore, this type of scale does not allow any individual to be purely an adaptor or purely an innovator. Specifically, individuals with scores ranging from 32-95 are considered more adaptive and prefer a more structured environment when solving problems. These individuals prefer well-established problems and favor working within the current problem structure (Kirton et al., 1991). More adaptive individuals tend to collaborate well with group members and generate ideas that favor consensus (Kirton, 2003). On the contrary, individuals who scores range from 96-160 are considered more innovative in nature and prefer less structure to solve the problem and often challenge boundaries (Kirton, 2003; Lamm et al., 2012). More innovative individuals tend to break the boundaries and generate ideas outside the current group structure (Kirton, 2003). Often, individuals falling more on the innovative side of the continuum tend to be novel and find diverse ways to solve problems. Whereas adaptors tend to be safer, more predictable, conforming, and less ambiguous when solving problems (Kirton, 1999, 2003). Therefore, the KAI was utilized in this study to understand the student's cognitive style and have a better viewpoint of how individuals in those groups tend to solve problems and interact with other cognitive styles when paired together.

Figure 1

Kirton's (2003) Adaptation-Innovation Theory (A-I Theory)



Methods

The data associated with this study were collected as part of a larger research project that investigated the effect students' cognitive style had on small engines problem-solving ability (Figland et al., 2019). A one-group pretest-posttest preexperimental design was used to collect data associated with this research project (Campbell & Stanley, 1963; Salkind, 2010). This method is used in educational research when all individuals are assigned to the experimental group and observed at two time periods (Campbell & Stanley, 1963; Salkind, 2010). However, because there is no comparison group it is impossible to determine if the change occurred from the intervention of other extraneous variables.

Population/Sample

The population/sample of this study were students enrolled in an introductory agricultural mechanic's course at Louisiana State University during the spring semester of 2018 ($n = 17$) and spring semester of 2019 ($n = 15$). However, one student from the spring semester of 2018 did not complete enough course work and was excluded from the study. Therefore, our population was $N = 31$. Demographically, the majority of our participants were female ($n = 17$, 54.8%), classified as sophomores ($n = 13$, 41.9%), and majored in Agricultural and Extension Education ($n = 13$, 41.9%) at Louisiana State University.

Homogeneity was tested using independent sample t-tests to determine if there were statistically significant differences between the students enrolled in the spring of 2018 and 2019 semesters

based on age ($p = 0.596$) and cognitive style ($p = 0.109$). A Chi-Square test was then utilized to determine if differences existed between gender and the two semesters ($p = .576$). This analysis revealed that out population was homologous; therefore, the data were merged for further analysis.

Instrumentation

To determine individual cognitive style, the Kirton's Adaptation-Innovation Inventory (KAI) were utilized. The KAI was given to all students via paper format at the beginning of the semester. The instrument consists of 32 items that are directed at understanding a person's preferred mode to learn. Scores fall between 32 and 160 on a continuum, with a midrange of 96 (Kirton, 2003). Meaning that individual scores ranging from 32 – 95 are considered more adaptive, while scores from 96 – 160 are identified as more innovative.

Due to the wide use of this instrument, internal reliability of this instrument has been measured through multiple studies. Kirton (2003) reported that internal reliability coefficients ranged from .84 – .89 after data analysis from six different studies. Further, a multitude of other studies that utilized the KAI showed reliabilities between .83 and .91 (Kirton, 2003).

To assess student motivation, we utilized the Course Interest Survey (CIS) developed by Keller (2010). The primary goal of this instrument was to determine how motivated students were before and after a particular lesson or course. For this study, all students in this course completed the CIS instrument via paper format at the beginning and end of the small gasoline unit. The CIS instrument was attached to the back of the pretest packet and posttest packet, which were handed out on the first day of the small engine's module and on the last day of the small engine's module. This instrument comprised of 34 items, which made up the four subscales of the ARCS model (Attention, Relevance, Confidence, and Satisfaction). Participants responded on a five-point Likert-type scale from *1 = not true*, *2 = slightly true*, *3 = moderately true*, *4 = mostly true*, and *5 = very true*.

The CIS instrument has been utilized in a wide variety of educational settings to determine its validity and reliability. Validity of this instrument were tested by correlating students CIS scores with their course grades and overall GPA (Keller, 2010). It was determined that all of the correlations between the CIS and course grades were above the .05 alpha level, and there were no correlations between the CIS and GPA at the .05 alpha level. This supports the validity of the CIS as a situational measure of motivation and not a construct measure of student learning (Keller, 2010). Also, internal reliability estimates were determined by utilizing Cronbach's alpha. The reliability estimates were determined by pretesting, revising, and retesting of 45 undergraduate students at the University of Georgia (Keller, 2010) and are displayed in Table 2. Internal consistency estimates were overall high for each subscale; therefore, the instrument was deemed reliable.

Table 2*CIS Internal Consistency Estimates by Keller (2010)*

Scale	Reliability Estimate Cronbach's α
Attention	.84
Relevance	.84
Confidence	.81
Satisfaction	.88
Total Scale (CIS)	.95

Course Structure

To determine cognitive style, the KAI was administered on the first class of the semester. Based on the student cognitive style score, the students were then purposefully grouped into teams of four. These teams were grouped to be either homogenous adaptive, homogeneous innovative, or heterogenous and remained for the remainder of the semester. Further, all course content, exams, and learning activities were designed around the team-based learning method outlined by Michealsen and Sweet (2008).

On the first day of the small gasoline engines unit, the students were administered a 30-item pretest and the Course Interest Survey (CIS). The small gasoline engine unit consisted of five individual modules. Those modules consisted of (a) small engine tool and part ID, (b) 4-cycle theory and fuel, (c) ignition and governor systems, (d) cooling/lubrication system, and (f) troubleshooting. At the completion of the small gasoline engines unit, the students completed the 30-item criterion referenced posttest and CIS.

Data Analysis

To achieve the objective of this study, descriptive statistics including mean, frequency, and standard deviations were used to gain a deeper understanding of the population and phenomenon being observed. Further, Mann-Whitney U tests were employed to determine if a statistically significant difference exists between course motivation and cognitive style. Mann-Whitney U tests were utilized in this study because the data were not normally distributed.

Results

At the beginning of the course, students were administered the Course Interest Survey (CIS) (Keller, 2010). The students completed the CIS at the beginning of the small gasoline engines unit and then were reassessed at the end of the unit. Overall, average individual pre-course motivation was 150.45, with scores ranging from 129-167. When looking at individual cognitive style categories, individuals who were more adaptive had a mean score of 149.57, with a range

of 129-167 on the pre-course motivation survey, while more innovative individuals had a mean score of 153 and a range of 135-165. In terms of the four CIS construct areas; the more adaptive individuals had a mean score of 4.01 in the pre-attention construct, which is interpreted as *mostly true*. The more innovative students also had a mean pre-attention score of 4.19, which was *mostly true*. On the relevancy area, the more adaptive individuals had a mean score of 4.61 and the more innovative individuals had a pre-relevancy score of 4.68, which are both interpreted as *very true*. Within the satisfaction area, the more adaptive individuals had a mean score of 4.49, which is interpreted as *mostly true*. The more innovative students had a mean score of 4.60 pre-satisfaction construct, which is interpreted as *very true*. Finally, in the area of confidence, the more adaptive students had a mean score of 4.45, which is *mostly true*. While the more innovative individuals had a pre-confidence mean score of 4.50, which are both interpreted as *very true* (See Table 3).

Table 3

Pre-Course Interest Survey Scores for Students Enrolled in Introduction to Agricultural Mechanics by Cognitive Style (N = 31)

Item	<i>f</i>	<i>M</i>	<i>SD</i>	Minimum	Maximum
Overall Pre-course Motivation	31	150.45	10.430	129	167
Overall Pre-course Motivation by Cognitive Style					
More Adaptive	23	149.57	10.166	129	167
More Innovative	8	153	11.464	135	165
Individual Construct Pre-course Motivation by Cognitive Style					
Attention					
More Adaptive	23	4.01	.521	2.250	4.750
More Innovative	8	4.19	.496	3.125	4.625
Relevance					
More Adaptive	23	4.61	.293	3.890	5.00
More Innovative	8	4.68	.509	3.625	5.00
Satisfaction					
More Adaptive	23	4.49	.452	3.56	5.00
More Innovative	8	4.60	.385	4.00	5.00
Confidence					
More Adaptive	23	4.45	.384	3.75	5.00
More Innovative	8	4.50	.509	3.625	5.00

On the post-course motivation survey, the average course motivation scores were 151.10, with scores ranging from 109-167. Also, the 23 more adaptive individuals had an average score of 152.09, with a range of 109-167 on the post-course motivation survey. Whereas the eight more innovative students had an average score of 156 and ranged from 141-167 on the post-course

motivation survey. In terms of the four CIS construct areas; in the attention area the more adaptive individuals had a mean score of 4.09, which is interpreted as *mostly true*. The more innovative students also had a mean post-attention score of 4.33, which is *mostly true*. In the relevancy area, the more adaptive and more innovative individuals both had a mean score of 4.64, which is interpreted as *very true*. Within the satisfaction area, the more adaptive individuals had a mean score of 4.56 and the more innovative students had a mean score of 4.67, which again was recorded as *very true*. Finally, in the area of confidence, the more adaptive students had a mean score of 4.58 and the more innovative individuals had a post-confidence mean score of 4.70, which were interpreted as *very true* (See Table 4).

Table 4

Post-Course Interest Survey Score for Students Enrolled in Introduction to Agricultural Mechanics by Cognitive Style (n = 31)

Item	<i>f</i>	<i>M</i>	<i>SD</i>	Minimum	Maximum
Overall Post-course Motivation	31	153.10	11.80	109	167
Overall Post-course Motivation by Cognitive Style					
More Adaptive	23	152.09	12.79	109	167
More Innovative	8	156	8.37	141	167
Individual Construct Pre-course Motivation by Cognitive Style					
Attention					
More Adaptive	23	4.09	.565	2.875	5.00
More Innovative	8	4.33	.347	3.875	4.875
Relevance					
More Adaptive	23	4.64	.418	3.110	5.00
More Innovative	8	4.64	.341	4.110	5.00
Satisfaction					
More Adaptive	23	4.56	.455	3.110	5.00
More Innovative	8	4.67	.316	4.110	5.00
Confidence					
More Adaptive	23	4.58	.341	3.75	5.00
More Innovative	8	4.70	.258	4.25	5.00

A Mann-Whitney U test was used to determine the statistical significance of the difference between students' course motivation by cognitive style. The Mann-Whitney U test determined that there were no statistically significant difference in course motivation by cognitive style ($p = .619$). (See Table 4).

Table 4

Mann-Whitney U Test for Differences in Course Motivation by Cognitive Style for Students Enrolled in Introduction to Agricultural Mechanics

<i>U</i>	<i>Z</i>	<i>p</i>
81	-.498	.619

Conclusions and Implications

Overall, the statistical analysis revealed there were no statistically significant differences between an individual's cognitive style and course motivation. Therefore, the researchers failed to reject the null hypothesis. However, it should be noted that the more innovative students had higher course motivations on the pre and posttest than the more adaptive students. Further, when diving deeper into each individual ARCS construct, all students had the highest motivation in the area of relevance and satisfaction. Therefore, the students in this course felt that the course content was relevant to their overall learning and indicated that they were highly satisfied with the course. This conclusion is consistent with research completed by Figland et al. (2019), which indicated students have an overwhelming positive perception of a team-based learning formatted agricultural mechanics course and were highly satisfied with the course. However, these findings were not consistent with previous research by McCubbins et al. (2016) and McCubbins et al. (2018), which indicated that working in teams increased student motivation to learn and work collaboratively.

Also, it should be noted that the more innovative individuals had higher course motivation on the pre and the posttest than the more adaptive students. It could be said that the more innovative students have higher motivations because of the TBL course structure, which allows students to take control of their learning (Michealsen & Sweet, 2004; Sibley & Ostafichuk, 2015). This conclusion would also be consistent with Kirton (2003), who reported that more innovative individuals prefer a less structured environment that allows for more idea generation ability. However, it should be highlighted that more innovative individuals are the least successful troubleshooters. This finding could be due to the nature of the problem being solved. In this particular course, all students were given the same troubleshooting problem, along with a hypothesis generation sheet. The problem that was given was open-ended, but only had one solution. On this point, Kirton (2003) found that more innovative individuals tend to get lost in the details and often have a challenging time wading through all their ideas. Perhaps, the more innovative individuals in this investigation generated too many ideas and had a tough time deciding where to begin, which extended their time to solution.

Recommendations

Additional research is recommended to further investigate the role cognitive diversity has on student motivation. The results from this study indicated no statistically significant relationship existed between cognitive diversity and course motivation. However, the more innovative students reported being more motivated on the pre and posttest than any other group.

Investigating factors associated with student motivation may bring insight into the role motivation has on problem solving ability.

Further research is also warranted to examine the effect an individual's metacognition has problem solving ability and cognitive style. Metacognition is the ability of an individual to regulate their cognitive activity. Research should be done to collect an individual's metacognitive ability to understand what factors can affect overall problem-solving ability. Understanding that association could allow researchers to uncover miscues in the problem-solving process and help the individual become a better problem solver by understanding how the individual regulates their cognitive processes.

Also, replication of this study is needed to increase the population size and statistical power. Increasing the population size to 50 students or more would allow the researchers to be able to analyze the data utilizing parametric statistics without committing Type-II errors. Further, when replicating this study, it is recommended that full random assignment of treatment and control groups be utilized. This will allow the researchers to generalize the findings past the population being studied.

Recommendations for Practice

From a practitioner standpoint, it is recommended that individuals be grouped by their cognitive styles in a manner that is conducive to the learners and environment. Results from a previous study indicate that purposeful cognitive style grouping has an effect on overall problem-solving ability when working in groups. Post-secondary practitioners should be able to recognize different cognitive styles and understand how to format learning activities/materials to meet diverse learning needs and promote problem solving ability.

It is also recommended that institutions utilize TBL or a form of flipped classroom, especially in a laboratory-based setting like agricultural mechanics. Even though results from this study found no differences, the students still had positive perceptions and motivations from the course. Figland et al., 2019), which indicate students have an overwhelming positive perception of a team-based learning formatted agricultural mechanics course and are highly satisfied with the course.

Limitations

The limitations of this study were the inability of the researchers to control all extraneous variables. Specifically, due to the nature of a pre-experimental study, full randomization of treatments and control groups were not utilized because all students elected to be enrolled in the introductory agricultural mechanic's course. To make these findings generalizable, full randomization of treatments and control groups is necessary.

Also, due to the low sample size, the power of the statistical procedures was low. Due to this factor, there is a higher chance of committing a Type-II error. Therefore, non-parametric statistics were utilized to describe and analyze the data in an attempt to lower Type-II errors.

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The Resiliency and Thriving of Gay Men in Agricultural Education: A National Mixed Methods Study

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Abstract

Gay men in agricultural education do not have comprehensive support within the agricultural education profession. When gay men decide to become agriculture educators, they often keep their identity private. This national mixed methods study aims to seek if gay agriculture educators are resilient and thrive in rural communities. The thriving elements of spiritual influence, personal competence, peer support, and family cohesion were surveyed and analyzed using a resiliency lens. Findings include gay male agricultural educators thriving in a heteronormative profession. Recommendations include ensuring LGBTQIA+ teachers have a support system through mentoring, program development, and post-secondary support through student teacher placements.

Introduction

The moment for full marriage equality arrived on June 26, 2015, with the Supreme Court decision in *Obergefell v. Hodges*. The lesbian, gay, bisexual, transgender, queer, intersex, and asexual plus (LGBTQIA+) community youth and teachers continue to feel unwelcomed into rural classrooms (Biegel, 2018). The current legal foundation that protects LGBTQIA+ teachers rest on the *Bostock v. Clayton County, Georgia* case, which ruled that an employer cannot fire someone based on sexual orientation or transgender status (Smilan, 2020). Although the court has provided reassurances in protecting LGBTQIA+ rights, the pressure to share one's identity increases one's risk of being outed by peers, being ridiculed by community members, harassment in the workplace, and job security (Bower-Phipps, 2017).

The LGBTQIA+ narratives that are depicted in the media primarily represent life for urban LGBTQIA+ individuals (McInroy & Craig, 2015). Through these depictions, the urban experience is the norm making the universal LGBTQIA+ experience seem to only occur in urban areas (Sorgen & Rogers, 2020). Metronormative narratives make rural LGBTQIA+ lives invisible and for teachers, makes supporting them all the more important. Recognizing and supporting LGBTQIA+ youth students in rural areas is essential (Sorgen & Rogers, 2020). As Stone (2018) states, "The city is imagined as a place of community and freedom from surveillance" (p. 1). As a result, rural LGBTQIA+ youth feel they must flee rural areas to escape the surveillance of their heteronormative communities (Gray, 2009).

Today, the LGBTQIA+ literature is moving away from metronormativity towards conceptualizing anti-urbanism (Herring, 2007). To combat metronormativity, anti-urbanism argues the lived experiences of rural LGBTQIA+ individuals reveal many positives of living in rural areas (Kazyak, 2012). In addition, rural LGBTQIA+ teachers may also influence LGBTQIA+ youth to stay in a rural area (Kosciw et al., 2014).

LGBTQIA+ teachers who live in rural communities may not have the opportunity to share their identity with their administrators, students, or the students' parents. Additionally, teachers report personal or professional identities as incompatible, which leads to low self-worth, depression, and anxiety (Lee, 2019). In rural settings, the "don't ask, don't tell" heterosexism construct perpetuates a public and personal denial of gay behavior, gay identity, gay relationships, and the gay community (Boulden, 2001). Fortunately, preservice teacher education programs provide multicultural education courses to assist teachers in diverse classrooms. Through these courses and trainings, heterosexual and LGBTQIA+ teachers learn how to serve LGBTQIA+ students better and help preservice teachers create a more inclusive classroom (Mitton-Kukner et al., 2015).

Although public attitudes towards the LGBTQIA+ community have moderated somewhat in the last few decades, studies continue to show rural areas have higher negative feelings about gay men (Keleher & Smith, 2012). Residents of rural communities tend to have more negative attitudes toward the LGBTQIA+ community than do residents of urban or suburban areas, a tendency that may be especially pronounced in more remote rural communities (Eldridge et al., 2006). Despite the heteronormative perceptions and statistics, gay men are finding careers in rural communities (Wienke & Hill, 2013). The current trend is showing gay men are moving away to seek higher education, but they are coming back to live in their rural community (Annes & Redlin, 2012). Gay men choose to live in rural areas for many of the same reasons straight people do because it is where they are from, where their families live, or where they feel at home (Gray et al., 2016). Therefore, gay men are seeking secondary teaching positions in rural communities which include agriculture science education careers.

Literature is on a path to aid future teachers in their awareness as to how to serve LGBTQIA+ youth and support LGBTQIA+ teachers, but agricultural education is falling behind (Murray et al., 2020). Currently, there is a limited literature depicting the lived experience of gay men who teach in rural communities. More specifically, there is a minimal research on gay men who teach agriculture in rural communities. This study attempts to examine the resiliency and thriving of gay men who accept the challenge to teach agriculture within rural communities.

Theoretical Framework

In the 1970s, psychologists, social scientists, educators, and academics started studying children that faced genetic and experiential adversity (Masten & Barnes, 2018). The overcoming of these adversities to find success in adulthood is now a phenomenon labeled as resilience. Resilience was developed and strengthened as a function of surviving past adverse experiences (Masten, 2001).

Resilience, as a component of the individual's personality, develops and changes over time through ongoing experiences with one's physical and social environment (Lee et al., 2007; Hegney et al., 2007). The degree to which one values themselves or finds themselves to be of worth is indicative of higher self-esteem (MacInnes, 2006). Lack of confidence or a view that one is less important than others is associated with low self-esteem (Heidari & Nemattavousi, 2020). Individuals with greater self-esteem tend to be more resilient and are more willing to attempt new endeavors or take on new responsibilities concerning work and other life activities (MacInnes, 2006; Resnick, 2015).

Teachers' resilience refers to the extent to which teachers can maintain positive attributes in the face of a range of challenges, pressures, and demands associated with their work (Kyriacou, 2011). Various protective and risk factors empower or disable teachers' resilient behavior (Fleming & Ledogar, 2008). A risk factor is considered any observable attribute of the individual (Kaplan, 2002) or the environment (Benard, 1991), which has been found to correlate significantly with a specific negative behavior or outcome. A risk factor is a possible cause or precursor of an attitude but not a direct or indirect outcome or symptom of behavior. Regarding the teaching profession, risk factors can be related to both individual and environmental attributes. At the individual level, the most critical risk factors are low self-esteem (Day, 2008), difficulties in seeking help (Flores, 2006), the conflict between personal beliefs and practices used (Beltman et al., 2011; Flores, 2006), anxiety and emotional exhaustion (Schlichte et al., 2005) and inadequate preparation for the reality of work (Demetriou et al., 2009). At the environmental level, risk factors are the adversities teachers may face due to constant changes in the education system may increase their levels of uncertainty, pressure, and workload (Gu & Day, 2007; Howard & Johnson, 2004).

Protective factors refer to those factors that mitigate the effects of risk factors or enhance the positive outcomes and the successful adjustment of the individual (Benard, 2004). Most instruments for the measurement of resilience assess a varying number of protective factors that enhance an individual's resilience.

The literature describes how analyzing thriving may explain how teachers overcome the risk factors. Thriving is an element of resiliency; therefore, thriving provides tangible constructs for the researcher to study. The thriving constructs further explain the protective factors that empower teachers to stay in the profession. Day (2008) states:

Research on teacher retention tends to focus on factors affecting teachers' decision to leave the teaching profession. Instead, what is required is a better understanding of the factors that have enabled the majority of teachers to sustain their motivation, commitment, and effectiveness in the profession (p. 256).

Therefore, the factors keeping teachers, predominantly minority teachers, in the profession need further research by utilizing the constructs of thriving.

Thriving suggests people will respond to thriving in three different ways when confronted by a challenge: They may (a) survive the incident, (b) recover from the incident, and (c) thrive as a result of enduring the hardship (Nishikawa, 2006). Daniilidou and Platsidou (2018) created the teachers' resilience scale to analyze the concepts of resiliency and thriving. The survey helps explain how spirituality, personal competence, peer support, and family cohesion work together to help teachers thrive.

As teacher resilience is an emerging field of research, there are sectors of research that directly deal with teacher resilience and others that examine related constructs. The area of research missing is the understanding of utilizing these constructs to analyze the resiliency and thriving of gay men in agricultural education. Using resiliency as the theoretical framework and the concept of thriving allows for the proposed research questions to be answered.

Purpose and Research Questions

The broader purpose of this explanatory sequential design study is to explore the perceptions of gay men who teach agriscience education regarding their profession. More specifically, the researcher analyzed the overall agricultural education field to provide insight into how LGBTQIA+ teachers are perceived in the profession. Utilizing a mixed methods approach allowed the researcher to examine the concept of thriving through a survey and prescreened individuals with at least five years of teaching experience in the same rural community. Once the participants completed the survey, the participants went through an interview. The following research objectives guided the scope of the study:

RO1: What elements of thriving (spiritual influence, personal competence, peer support, family cohesion) allow gay men to succeed in agricultural education?

RO2: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *spiritual influence* element of thriving?

RO3: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *personal competence* element of thriving?

RO4: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *peer support* element of thriving?

RO5: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *family cohesion* element of thriving?

Methodology

Characteristics of Mix Methods Research

In mix methods research, the inquiry is based on the assumption that collecting diverse types of data provides a more complete understanding of the research problem than quantitative or qualitative data alone (Creswell & Creswell, 2018). The following study employs the explanatory sequential design mixed method (Hanson et al., 2005) to adequately explore the topic of the resiliency and thriving of gay men in agricultural education. Greene (2008) states:

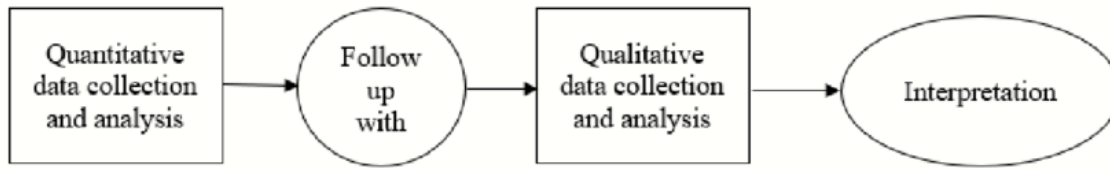
A mixed methods way of thinking is an orientation toward social inquiry that actively invites us to participate in dialogue about multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important and to be valued and cherished.

For this mix method study, a broad survey was used to generalize results to a population and then, in a second phase, focuses on qualitative, open-ended interviews to collect detailed views from participants to help explain the initial quantitative survey (Creswell & Creswell, 2018).

The Explanatory Sequential Design

The explanatory sequential design frames the concurrent or sequential collection and analysis of quantitative and qualitative data sets (Creswell & Clark, 2011). The purpose of the explanatory sequential design is to conduct research that clearly explain the qualitative data by referring to the initial quantitative data (Creswell & Clark, 2011). Figure 3.1 displays the process of the explanatory sequential design. For this framework to successfully be used, the researcher must first provide the participants with a quantitative piece (questionnaire) followed with a qualitative (case study) element. Each must be collected before interpretation can occur.

Figure 1. The Explanatory Sequential Design



Note. Model depicted by Creswell & Clark, 2011.

The researcher is utilizing a social constructivist worldview. Social constructivists seek an understanding of the world in which they live and work (Creswell & Creswell, 2018). The researcher utilized social constructivism to help understand the multitude and complexity of views surrounding gay men in agricultural education and the men’s lived experiences.

Participants

Participants in this study were either current, past, or recently retired secondary agriculture teachers. They all identified as gay and as a male. Snowball sampling (Goodman, 1961) was utilized to help spread awareness surrounding the current work. Snowball sampling allows participants to provide information about the study to individuals who may qualify to participate to gain awareness of the research (Goodman, 1961). Through snowball sampling, more gay men were able to participate in the survey. Due to snowball sampling, the researcher is not knowledgeable of how many received the recruitment email but was later informed that it was shared on private social media group pages, specifically for the gay community.

A total of 45 gay men completed the survey portion of the study. Eighteen teachers agreed to participate in the qualitative portion; however, twelve completed the interview. The six non-participants did not respond to a second interview invitation or decided to no longer participate due to time restraints. Contact was made with the other seven participants who initially qualified for the interview, but after a lack of response from a follow-up email, further contact was discontinued.

Table 1 provides an overview of teaching experience, observed personality during the interview, and whether each gay man was open about their sexual orientation at school. The researcher utilized the Myers-Briggs personality types and definitions to help him describe each participant’s observed personality (Judge et al., 2002). Collectively, the men have 115 years of teaching experience. The location of the gay men is to stay anonymous; however, each region of the National FFA Organization is represented (ffa.org, 2022).

Table 1
Participant Information (n = 12)

Pseudonym	Teaching Experience	Observed Personality during the Interview	Open Yes/No
Troy	9 years of teaching experience	Cool and Calm	Yes

Freddie	6 years of teaching experience	Succinct and Realistic	No
Harry	5 years of teaching experience	Outgoing and Bubbly	Yes
David	8 years of teaching experience	Kind and Quick	Yes
George	7 years of teaching experience	Diligent and Considerate	Yes
Adam	8 years of teaching experience	Shy and Intelligent	No
Ricky	5 years of teaching experience	Reserved and Caring	No
Michael	15 years of teaching experience	Bold and Optimistic	Yes
Sam	6 years of teaching experience	Reflective and Laid-back	No
Clay	11 years of teaching experience	Determined and Easygoing	Yes
Tyler	28 years of teaching experience	Established and Easygoing	No
John	7 years of teaching experience	Passionate and Warmhearted	No

Each of the participants met the criterion of having a minimum of five years teaching experience in the same rural school. The researchers set the criterion at five years to ensure that the teachers had built rapport in their community/school (Topchyan & Woehler, 2021) and had obtained tenure status. A total of twelve interviews were conducted out of the eighteen who qualified. The seven remaining individuals were unresponsive to follow-up emails so further contact was discontinued.

Findings

After four months of email invitations, follow-up reminders, and tracking of snowball sampling, 45 participants completed the questionnaire and 12 of the 45 agreed to participate in the qualitative portion of the mixed methods research design. Using an explanatory sequential mixed methods research design, chapter four depicts the quantitative and qualitative findings and their relationship to one another.

Research Objective 1: What elements of thriving (spiritual influence, personal competence, peer support, family cohesion) allow gay men to succeed in agricultural education?

Research objective one sought to evaluate the four thriving elements of the teachers' resilience scale (TRS) that Daniilidou and Platsidou (2018) developed. Through measures of central tendency, Table 2 depicts that personal competence ($m = 3.98$; $SD = 0.48$) was the highest perceived thriving element among the rural secondary agriculture teachers who identify themselves as gay. Following personal competence was peer support ($m = 3.88$; $SD = 0.67$), family cohesion ($m = 3.70$; $SD = 0.92$), and spiritual influence ($m = 3.50$; $SD = 0.65$).

Table 2

Thriving elements as described by rural gay secondary agriculture teachers (n = 45).

Element	<i>n</i>	<i>m</i>	<i>SD</i>	Minimum	Maximum
Personal Competence	45	3.98	0.48	3.00	5.00
Peer Support	45	3.88	0.67	2.00	5.00
Family Cohesion	45	3.70	0.92	1.00	5.00
Spiritual Influence	45	3.50	0.65	2.00	5.00

Note: TRS responses were based on a 5-point Likert scale ranging from 1 (not true at all) to 5 (almost always true) with 3 as neutral point. All responses are based upon the teachers’ resilience scale (Daniilidou & Platsidou, 2018).

RO2: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *spiritual influence* element of thriving?

Spiritual influence is the lowest of the four elements in the quantitative data; however, the mean score ($m = 3.50$) is above the neutral point. Consistently across the interviews, participants spoke how religion and politics interfere with their ability to thrive. Starks and Robinson (2009) explain how religion and politics are nearly inextricable when analyzing spiritual influence. Therefore, the researcher pulled themes that explain the complexities of religion and politics impacting the spiritual influence of the thriving element.

Some of participants discussed how their religious upbringing was an obstacle that they faced when coming out to their loved ones. John explains with sincerity:

So, a lot of my reservations about telling my family were grounded in religious beliefs, religious perspectives, I was baptized . . . [and] I knew what their beliefs were. And I knew, I mean, I’d heard that [being gay meant you were condemned] at sermons, and things like that.

For John, the sermons that he heard at church made it more challenging for him to accept his sexuality. He was not the only one who struggled with a religious upbringing. Sam, who is closeted, still struggles with his identity. He states, “I still struggle with [being gay] to be quite honest. And a big part of that comes from growing up in a very conservative evangelical home. And I’m still not actually completely open with my family about it.”

RO3: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *personal competence* element of thriving?

Personal competence is a set of skills that include self-awareness, self- management, social awareness, relationship skills, and responsible decision-making (Feuerborn & Gueldner, 2019). Several of the men shared with the researcher their understanding of defining characteristics of self. Through these conversations, the men discussed that identifying as a gay man does not define who they are, but it is part of who they are, and that is a distinction that was made throughout these interviews. Troy states with gusto, “My sexuality isn’t my number one defining feature. I let my agricultural background and knowledge, my hobbies, my passions, and my interests be more of my defining features. . . [My sexuality is] just a piece of me”. Harry, who is

an openly gay man echoes the same sentiment when it comes to being themselves in the classroom. Harry explains:

Regardless of whether or not I date men, that's not the first thing about me. It's a small subset of who I am as an overall individual. My sexuality is not what I'm always going to talk about in class. I don't force my opinions upon people. I feel like some people do. I am who I am. I have a fiancé. Ultimately, that's my personal life, and I'm at school, and if it comes up, it comes up, but it's not like my sexuality is the talk of the town.

RO4: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *peer support* element of thriving?

Identifying the support systems of gay men in agricultural education helps in the understanding of why these men stay in the profession. The lack of support from administration, community members, students, and the parents of the students may hinder gay men in their ability to thrive (Robinson & Ferfoja, 2001). Therefore, the peer support systems that gay men belong to in agricultural education provided significant insight on how gay male agricultural educators thrive.

To understand the magnitude of peer support, David explains how he provides his students with support. David unapologetically states:

You show your kids that you love them, and you care for them, and you want to be authentic, and you want to be yourself, and you want to support the students 100% even if you cannot support yourself some days, they are going to give you the same back. I really think that when you look at how do they support you? How do they support you personally? How do they support you mentally? How do they support you emotionally? It goes beyond gifts. It really comes down to the concept of how they can mentally make you feel like you belong at your school. How can they inspire you to want to get out of bed every day? And I think the most significant component with that is, there are days I do not want to go to work, there are days I want to call in sick, but when I sit there, and we have a CDE [Career Development Events] practice, and I know that kids really want to learn about that concept. That is when you know that they support you 100% because they need you there. And you can pry yourself out of bed to go.

David explains how his students support him, and how he supports his students. In this section, the researcher decided to include students as the participants' peers. Most agricultural educators spend more time with their students than they do with any other group they may interact with at any given time.

RO5: How do gay male agriculture teachers contribute their longitudinal success in the classroom to the *family cohesion* element of thriving?

Every man interviewed discussed how their family unit contributed to their overall thriving. The mean TRS ($m = 3.70$) was the second-lowest recorded. However, the men accredited the individuals they interact with daily to their overall success.

David discusses how his father was an agriculture teacher, and how he always knew he could rely on him to ensure that he had a place in FFA. David states, "I pay tribute to that because my dad was my ag teacher. So, I knew I always had my dad".

Michael explains that he can talk to his mom about anything. He states, "So I just talk to her about pretty much everything". Michael's mother accepts him for who is, and he talks to his

mother about life. Then, there is Tyler. Tyler's parents are the only family members of his that are aware of his sexual orientation. Tyler explains the unconditional love his parents have for him:

My parents are accepting. We do not talk about [me being gay] much. Especially my dad. He knows. And I know he loves me, but it is just one of those things he does not feel comfortable talking about it, so we just do not discuss it. My mom loves me.

Tyler's father does not discuss his son's sexuality, but he does love Tyler. Tyler cares for his parents, and they help him to thrive.

Conclusions, Implications, and Recommendations

Gay men in agricultural education are resilient and are thriving in the classroom, but gay men have their own unique challenges to overcome to thrive in the profession. Spiritual influence, personal competence, peer support, and family cohesion are pivotal in the understanding of how these men thrive in agricultural education. The researcher has provided the reader with the themes that emerged from the interviews and provided conclusions and dialogue to help summarize the findings.

Most of the men did not contribute their success to spiritual influence, but a few men did accredit thriving to their faith. Ironically, having a religious upbringing was acknowledged by the men as a reason for becoming more resilient later in life, not because of their love for faith, but how the participants felt attending church and having to suppress their identity due to their faith. Throughout sermons, the participants explained how identifying as gay is a sin, and that identifying as gay is condemning. Hearing that growing up has psychological consequences (Barton, 2010). It is imperative to understand that one cannot simply pray the gay away, and heterosexual individuals who participate in and applaud saying that gay men are going to Hell is committing a microaggression (Nadal et al., 2011). Regardless of how many times an individual who feels uncomfortable with LGBTQIA+ identity say, "I do not agree with your lifestyle" or "do not say gay", people cannot change who they are attracted to at a given time (Marshall & Hernandez, 2012).

Conversely, several men stated that their faith is something that no one can take away from the participants. By utilizing resiliency, the men who shared that their faith plays a significant role in their lives allow the gay men to be resilient (Walker & Longmire-Avital, 2013). Through these conversations, the researcher concludes that religion is a sensitive topic to discuss with rural agriculture teachers because of the complexities of organized religion.

Some research participants expressed difficulties teaching in traditional Christian conservative environments and not connecting with conventional families. Not having the ability to relate with individuals impacts resiliency by creating an additional barrier for gay men to overcome (Hash & Rogers, 2013). The researcher found it captivating that the men admitted to being a valuable addition to the rural Christian conservative environments they serve. Therefore, the openly gay male agriculture teachers provide students with diverse perspectives compared to the lived experiences of rural heterosexual teachers and communities. Research shows that the more exposure students have at an early age to diverse perspectives, the more successful they will be at interacting with individuals with various backgrounds from their own (Keengwe, 2010). The

men thrive in their communities while helping their students understand that people comprehend information in various ways.

Personal competence provided critical insight on how gay men in agricultural education thrive. The men's sense of self helped the researcher to draw conclusions. Gay agriculture teachers must be more than good teachers. Several men expressed that their students do not regard their educator's identity as a negative trait. Although, several participants explained how identifying as a gay man led the participants to believe that they were not doing their jobs adequately. Therefore, participants explained that they felt they constantly needed to prove that they were the right candidate for the job. By overcoming the mindset of being a good teacher, gay agriculture teachers become more resilient. Demonstrating that they are the best educators helps these men subconsciously thrive (Hutchins & Rainbolt, 2016). Gay men are more intentional in their decisions than their heterosexual peers in the classroom because of their identity.

Gay men who keep their identity a secret have more depressive symptoms than gay men who are open about their sexual orientation (Fingerhut et al., 2010). The depressive state is harmful and diminishes one's mental health (Burgess et al., 2007).

Research has aided in describing how one's mental health is correlated with the intricacies of the coming out process, which impacts resiliency (Kosciw et al., 2014). Concurrently, coming out and its impact interferes with one's ability to thrive. There is a stark contrast between the closeted and open gay male agriculture educators. The closeted men explained a fear that once they came out, they would no longer be the *agriculture educator* but the *gay agriculture educator*. There is a dread of being outed. Contrarily, the openly gay men's vulnerability to being out allows the participants to thrive, and there is no fear of being outed.

Each gay male agriculture educator varied in lived experiences. Each man has his unique perceptions of being gay. Some had lived experiences that contributed to the participants' ability to thrive. At the same time, others had stories that explained how gay agriculture educators are resilient. Overall, gay agriculture teachers stay in agriculture education because they love their jobs and students.

For educators, empathy and sympathy are central to sociological thinking while interacting with students (Rockwell et al., 2019). The gay men interviewed expressed how they have more empathy and sympathy because of their identity. As children, the gay agricultural educators recall how adults treated the participants while figuring out their identity. The experiences growing up had a lasting impact on each man's life - assisting them to become more empathetic and sympathetic with individuals who share similar challenges in belonging to the LGBTQIA+ community or belong to a marginalized group (LaSala, 2010). The men are more resilient because of their challenges while coming out or identifying as gay.

Gay agriculture teachers may face unique hardships with their identity and teaching. For the educators, they stay in the profession because of their students. The teachers stated that the students did not care how the men identified if they knew that the teacher cared about their well-being and learning—the teacher recalled stories of how their students helped the participants

thrive. Adolescents are resilient (Hauser et al., 2008), and their gay agriculture educator is resilient too.

The men shared that most of their schools have consequences for students who participate in homophobic rhetoric. The men recall when their students called the participants a faggot. Being called derogatory terms has the potential to psychological harm gay men who constantly hear these terms that are directed towards their identity (Slaatten et al., 2015). As the participants explain, by the school disciplining students who use homophobic rhetoric, they feel respected as a gay man in their rural school.

Most of the participants felt supported at their rural schools. The support stemmed from the men doing their jobs adequately and fulfilling their duties as a teacher. Once the researcher included sexual orientation, the conversations changed. The participants explained how their coworkers were homophobic. The gay agriculture teachers stated that their students were not as homophobic as their coworkers. Teachers and other adults do not understand the severity of how harmful homophobic rhetoric is to the LGBTQIA+ community (Poteat et al., 2019). One of the participants explained how teachers are entering the profession for the wrong reasons, alluding those teachers are not prepared to educate populations that vary from their own. For the closeted gay agriculture teachers, their homophobic coworkers are adding an extra stressor in the coming out process. Through these interactions, the participants become more resilient.

Finding validation from other LGBTQIA+ teachers has helped gay agriculture educators thrive. Multiple participants discussed how belonging to a social media group allows a space to see they are not alone. Additionally, several men discussed how they are not the only LGBTQIA+ community member at their rural school. Having other community members at their schools they can turn to for guidance has aided the educators tremendously.

Community support is imperative for agriculture educators (Pratt et al., 2021). Therefore, gay agriculture educators agreed that having community support is essential for a successful classroom. There were mixed reactions regarding the LGBTQIA+ community. Parents of LGBTQIA+ youth believe that their child will thrive with a gay agriculture teacher. On the other hand, several men describe leaving the classroom because of their identity. Through understanding how to navigate the community's social pressures, gay men become more resilient (Bartone, 2017).

The researcher recommends that additional research surrounding the LGBTQIA+ community should include interviewing and surveying heterosexual agriculture science teachers and analyze their perceptions of the LGBTQIA+ community. Through this work, it will aid in the understanding of the biases and misunderstandings that heterosexual people have toward the LGBTQIA+ community. Additionally, theories and conceptual frameworks including, but not limited to, the theory of planned behavior, theory of intersectionality, theory of hegemony, masculinity, queer theory, metronormativity, heteronormativity, and urbanormativity, should be researched and used to see how researchers and practitioners can enhance behaviors and perceptions of preservice and veteran teachers' acumens on topics surrounding the LGBTQIA+ community. Gay men are not the only members of the LGBTQIA+ community; therefore, additional research surrounding other queer populations must occur in agriculture education.

Further research into masculinity and power dynamics within agriculture science education is needed. The parameters of this work did not focus on those areas, but the literature describes in detail how these constructs impact the LGBTQIA+ community. For this work to take place, the researcher encourages individuals to work in school systems to understand how these two dynamics work together in a classroom setting. Therefore, it is recommended to research these topics and how they impact the profession and high school classrooms. The researcher also recommends continuing the work of Murray et al. (2020) states in their research to help all the identities within the LGBTQIA+ community within agricultural science education.

An estimated 3.5% of adults in the United States identify within the LGBTQIA+ community. That implies that about nine million Americans belong to the community which is equivalent to the entire population of New Jersey (Gates, 2021). Therefore, those nine million adults were children once, and most of them went through the American public school system. Agriculture science education belongs to that system who is educating the adults that belong to the LGBTQIA+ community.

Extensive training on multiculturalism must occur for all preservice educators surrounding topics on underrepresented populations. Homophobia should not be occurring in one's classroom. Therefore, teachers must ask themselves if they have the capability to serve a child that belongs to the LGBTQIA+ community before committing themselves to the teaching profession. Providing an inclusive classroom for all must be at the forefront of all educators (Lindsay, 2003).

LGBTQIA+ representation in schools is essential but tokenizing (Linley & Nguyen, 2015) needs to be monitored. It is not the responsibility of these men to educate individuals on LGBTQIA+ identities. Therefore, the researchers recommend that preservice teachers, practicing teachers, and higher education personnel attend professional development surrounding these topics. The researcher plans to develop a series of professional development that will aid in the understanding of the topics discussed in this document. He will seek guidance, but no one should feel exploited to develop a curriculum based solely on their identity. Murray et al. (2020) has started the conversations, but the teaching must occur.

Gay male agriculture educators are not going anywhere soon and are here to stay. It is time to accept individuals for who they are and appreciate varying perspectives as a profession. For gay men in agricultural education, the researcher recommends calling homophobic rhetoric, facial expressions, and degrading comments that make one feel small out. Use this time as a teaching opportunity.

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Communicating Cooperatively: Exploring Social Media and Online Communication Use of Agricultural Commodity Cooperatives In Texas

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Abstract

Currently, little research or exploration into cooperatives' communication efforts and strategies with their members has been undertaken. Integrating social media and online communication channels in a cooperative's strategic communication plan could help foster relationships between the cooperative and its members. Cooperatives build and maintain relationships with external publics and their members through frequent and clear two-way communication, and these relationships are crucial to their success. Using a two-phase, mixed-methods analysis, this study sought to identify social media and online communication channels utilized by agricultural commodity cooperatives in Texas and to analyze cooperative managers' perceptions and communication strategies when using these tools to communicate with their members. A communications audit of all agricultural commodity cooperatives in Texas (n = 78) was conducted in phase one. In phase two, six agricultural commodity cooperative managers were interviewed to gain insight into their perceptions and communication strategies when using online communication tools. Agricultural commodity cooperatives in this study have been slow to adopt and integrate social media and online communication channels into their communication strategies. There is great potential for researchers, cooperative managers, Texas Agricultural Cooperative Council, and social media strategists to improve two-way communication between agricultural commodity cooperatives and their external publics.

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Introduction/Theoretical Framework

An organization's success is often credited to its strong communication practices and its relationships with external publics. Thus, it is no surprise that organizational communications literature has credited the failure of many organizations to a non-existent, or poorly executed, communications strategy (Baker, 2007). Audience members are no longer satisfied with one-way communication from organizations and brands (Berthron et al., 2012). Instead, audiences are gravitating toward relationships two-way communication tools, like social media, can facilitate.

Cooperatives are a unique type of organization in that they are owned, operated, and governed by their members (Ortmann & King, 2007; University of California, 2021). Cooperatives account for approximately \$226 billion in revenue annually within the U.S., with more than half of that total contributed from agricultural cooperatives (Rocha, 2021). Approximately two million U.S. farmers take ownership in one of 2,100 agricultural cooperatives nationwide (NCBA, 2021), which include agricultural commodity cooperatives, such as cotton gins or grain elevators, that provide marketing, supply, and service benefits to their members. Success for a cooperative lies in

meeting the needs of its members (Baseman, 2012), making effective communication efforts of a cooperative all the more important.

Literature on cooperative organizations emphasizes the importance of transparent, clear, and frequent communication on a cooperative's overall success (Baseman, 2012; Georges & Caleman, 2021; Haigh, 2000). However, despite widespread technology adoption and a sizeable cooperative footprint in the U.S., agricultural cooperatives, in particular, remain slower to adopt innovative and diverse communication strategies to reach their members (Georges & Caleman, 2021). Georges and Caleman (2021) argued that a cooperative's online presence and use of social media are essential in building and maintaining relationships with their members. Since a cooperative's members are its owners, they must be regularly updated and informed on cooperative matters to remain involved and committed (Bhuyan, 2007; Brown et al., 2013; Haigh, 2000). Integrating social media and online communication channels in their strategic communications plans could help cooperatives foster important relationships between the organization and their members.

Currently, little research or exploration related to cooperatives' communication efforts and strategies when communicating with their members has been conducted. Georges and Caleman (2021) expressed an absence of literature on communication studies in agricultural cooperatives and suggested future research is specifically needed to evaluate the use of social media and online platforms within cooperatives to determine if these communication methods are effective as complements, or possibly substitutes, to traditional communication channels. Further, to better guide cooperatives on the use of online communications strategies, it is first essential to understand how the cooperatives are using them currently, if at all, and why.

Using the Organizational-Public Relations Theory (Ledingham & Bruning, 1998), this study was guided by the principle that cooperatives build relationships with their members – the owners of the cooperative – through frequent and clear two-way communication. As this theory explains, communication helps organizations build and maintain relationships with external publics, like a cooperative's members. These relationships are crucial to an organization's success, and a lack of effective communication can lead to an organization's failure in some cases.

Purpose and Objectives

Agricultural cooperatives are combining their businesses through mergers, acquisitions, joint ventures, and strategic alliances at a record pace (Richards & Manfredo, 2003; Sfiligoj, 2020). With these changes and growth, marketing costs increase causing cooperatives to focus on more effective and efficient marketing strategies for their members (Thibault, 1991). The integration and use of different communication channels, varied communication strategies, and how often information is communicated can affect the cooperative-member relationship (Chesnutt, 1997). However, there is currently an observed gap in literature specifically pertaining to communication from the cooperative as an organization to their members, the owners of the organization, particularly in the use of social media and online communication methods. To address this gap in literature, this study focused on exploring a deeper understanding of how agricultural commodity cooperatives in Texas utilize social media and online communication tools when communicating with their members to gain a beginning understanding of how and

why these tools are adopted. A two-phase, mixed-methods analysis was utilized to explore this topic.

In the first phase, a quantitative communications audit of social media platforms and online communication channels utilized by these cooperatives was conducted. Three objectives were used to guide this first phase:

- RO1:** Identify the social media platforms and online communication channels utilized by agricultural commodity cooperatives in Texas
- RO2:** Explore the type of digital content communicated through online communication channels and social media platforms by these cooperatives
- RO3:** Determine the frequency of communication via these online communication channels and social media platforms by these cooperatives

Using data gathered from the communications audit, a qualitative interview guide was created to further explore the use of social media and online tools within the cooperatives from the perspective of their cooperative managers. Two objectives were used to guide this second phase:

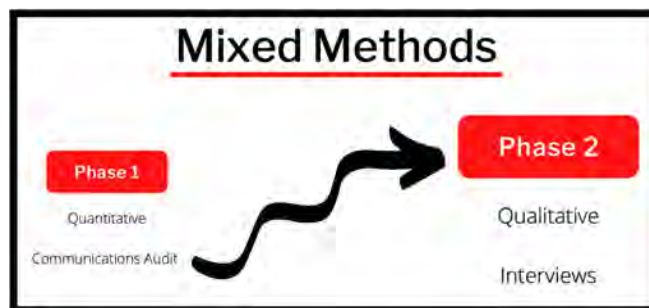
- RO4:** Explore cooperative managers' communication strategies when selecting social media platform(s) or online communication channel(s) to communicate with their members
- RO5:** Gain insight into cooperative managers' perception of the social media platforms and online communication channels currently utilized by their cooperative

Methods/Procedures

A sequential mixed-methods approach was used for this study in which the findings from the first phase – a quantitative communications audit – were used to guide and inform the research design and purpose of the second phase – qualitative interviews with cooperative managers (see Figure 1 below) (Creswell, 2014).

Figure 1

Mixed Methods Research Design



Phase One

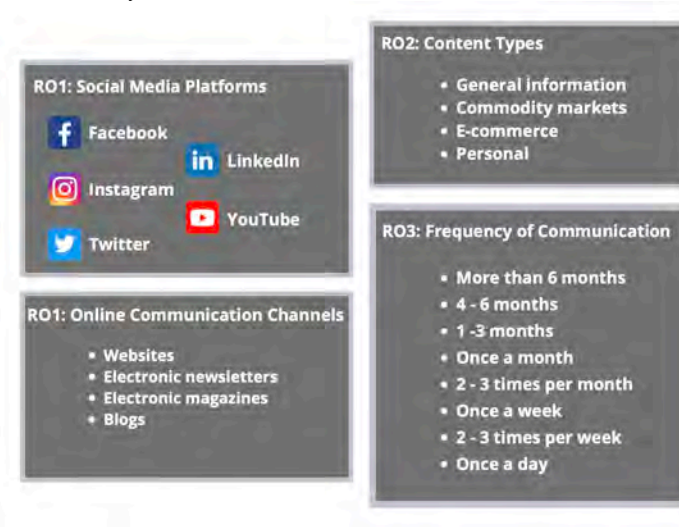
In phase one, a quantitative communications audit was conducted to gain more insight into the social media platforms and online communication channels used by the participants in this study. A communications audit assesses an organization's internal or external communication activities (Coffman, 2004), and while similar to a content analysis, differs in that the focus is on identifying "what is being done well, what is not being done well, and how communication efforts can be improved" (Goodwin et al., 2014, p. 1). In this study, only external communication from the cooperatives to their members was investigated. Specifically, this audit focused on identifying which social media platforms and online communication channels each cooperative utilized, what type of content they shared through these means, and how they were used.

The population for this phase consisted of cooperatives that are members of the Texas Agricultural Cooperative Council (TACC) ($N = 150$). Criterion sampling was utilized to select member organizations of this association who were categorized as agricultural commodity cooperatives ($n = 78$, 52%). Because only agricultural commodity cooperatives in Texas who are members of the TACC were selected, the data from this study are only valid for this sample and, therefore, cannot be generalized to a larger population, including, but not limited to, electric and telephone cooperatives in the state.

A researcher-developed codebook was created in Microsoft Excel and was used to code and record each cooperative's online and/or social media presence, the content of communication found online, and the frequency of posts or updates on each social media platform and online communication channel. Content and face validity of the codebook were reviewed by a panel of experts prior to data collection as suggested by Heale and Twycross (2015). Coded content categories included general information about the cooperative, commodity market information, e-commerce and online purchasing, personal information unrelated to the cooperative, and combinations of these content categories. Content related to the cooperatives' address, phone number, email, hours of operation, upcoming meetings, personnel lists, and the cooperative history were coded as general information. Commodity market information included the most recent commodity price, often updated in real-time by a third-party website provider. If the cooperative provided information related to their farm store specials or provided users with the ability to purchase supplies directly online, this information was coded as e-commerce or online purchasing. Personal information unrelated to the cooperative encompassed a variety of content: obituaries, grandkids, community fundraisers, community news, shared posts from news outlets, shared posts from other Facebook users, personal opinions, etc. Figure 2 below provides a summary of the codebook.

Figure 2

Phase One: Codebook Summary



Because this was an audit of all online communication channels and social media platforms used by the sample, the researcher performed various searches in Google and searches within each social media platform for each cooperative in May and June of 2021. The researcher searched each cooperative's name using "cooperative" and "co-op" because these terms are often used interchangeably by these organizations. If the cooperative utilized an alternative communication channel or a third-party website, this information was also recorded in the researcher's codebook notes. Alternative communication channels included any additional social media platform not analyzed in this study or alternative online communication channels, like smartphone apps or third-party websites hosted on behalf of, but not controlled by, the cooperative.

Descriptive statistics and frequency counts were calculated for each coded variable in Microsoft Excel. The researcher calculated the total number of users for each social media platform and online communication channel. The type of content and frequency of updates for each social media platform and online communication channel were also tallied and recorded by the researcher in Microsoft Excel. The researcher used SPSS to calculate the mean, median, and mode for page likes, users following the cooperative, and accounts the cooperative followed. The social media platforms and online communication channels most commonly used among the sample was determined and was used to guide the purpose and research design of the qualitative interviews with cooperative managers in the next phase.

Phase Two

Based on the findings from Phase One, the second phase of this study sought to explore cooperative managers' communication strategies when selecting a social media platform or online communications channel to communicate with their members and to gather insight into their perception of their organization's use of these communication tools through one-on-one, semi-structured interviews. Criterion sampling was again used to select participants from the sample from Phase One based on their use of multiple social media platforms, their frequency of

online communication efforts, and the size of their cooperative. Six ($n = 6$) cooperative managers were recruited to participate in the second phase of the study and were interviewed in September 2021.

A researcher-developed interview guide containing 49 open-ended questions was used to guide the interviews with the cooperative managers. The interview guide questions were based off of the findings from the data collected in Phase One and were organized into four sections: introduction, social media, online communication channels, and concluding questions. Introduction questions were used to build rapport with the participants as suggested by Adhabi and Anozie (2017), Carruthers (1990), Knox and Burkard (2009), and Stuckey (2013). Social media-specific questions addressed which platforms the cooperative managers' organizations were currently using, the frequency of posts or updates on the platforms, and types of frequently shared content. Questions were structured similarly for the third section related to online communication channels (websites, blogs, online newsletters, and online magazines). At the end of each interview, the researcher clarified the data provided by the participant and provided them an opportunity to add any additional information that might have been left out or information the participant thought might be relevant to this study.

Interviews were conducted face-to-face, as suggested by Creswell (2007) and Polkinghorne (1994), averaged around one hour in length, and were audio recorded for accuracy and to aid in transcription of the data. In addition to interview transcripts, the researcher took detailed field notes during each interview. Field notes, interviews, and conversations can empower individuals to share their stories and experiences in the context or environments where the participants address the problem or issue (Creswell, 2007).

All interviews were transcribed verbatim using Otter.ai, an online transcription software, and were then verified for accuracy by the researcher. Each participant was assigned a pseudonym to protect their identity and the confidentiality of their responses. Interview data were uploaded to Delve, a cloud-based, computer-assisted qualitative data analysis software, and were analyzed using open and axial coding procedures as suggested by Williams and Moser (2019) and Deterding and Waters (2021).

As suggested by Lincoln and Guba (1985), credibility, transferability, dependability, and confirmability measures were used to establish an objective foundation in the qualitative interviews. The use of member checking, peer debriefing, triangulation of multiple data sources, audit trails, detailed notes and records, a researcher reflexivity statement, and rich, thick descriptions of participants and data helped to ensure the qualitative rigor of this research. However, it should be noted that these findings are limited to the sample of agricultural commodity cooperatives in this study.

Findings

Phase One – Communications Audit

A wide variation was found in the utilization of online communication and social media tools by the agricultural commodity cooperatives in this sample (see Table 1). The most commonly used

tool among this sample was Facebook ($n = 57, 73\%$) followed by user-maintained websites ($n = 30, 38\%$). User-maintained sites were found to be maintained by the cooperative itself or a contracted third-party host site on behalf of the cooperative versus sites maintained or updated by external organizations outside of the cooperative's control. Beyond these two tools, the utilization of other online communication tools and platforms decreased dramatically.

Table 1

Social Media and Online Tool Usage ($n = 78$)

Communication Tool	Frequency (n)	Freq. Percent (%)
Facebook	57	73%
User-Maintained Websites	30	38%
Instagram	7	9%
Websites Maintained by External Organizations	6	8%
Online or Digital Newsletter	4	5%
LinkedIn	3	4%
YouTube	3	4%
Twitter	2	2%
Online or Digital Magazine	1	1%
Blog	1	1%

Facebook. Of the Facebook pages found, the majority ($n = 55, 96\%$) were business pages, while two ($n = 2, 4\%$) were set up as personal profiles. Account 'likes' on the business pages ranged from zero to 2,000 with a median of 305. Most ($n = 33, 58\%$) accounts in this study ranged from zero to 500 likes. The frequency of communication found via Facebook varied greatly (see Table 2). Most accounts had no new posts/updates in more than six months prior to data collection ($n = 23, 40\%$). Ten accounts ($n = 10, 18\%$) posted/updated on average two to three times a week, and five ($n = 5, 8\%$) accounts showed no posts/updates since they were created.

Table 2

Frequency of Communication on Facebook ($n = 57$)

Frequency of Communication	Frequency (n)	Freq. Percent (%)
No communication in 6+ months	23	40%
2 – 3 times per week	10	18%
1 – 3 months	6	11%
Once a month	6	11%
4 – 6 months	5	8%
2 – 3 times a month	2	3%

Note. Five ($n = 5$) cooperative Facebook accounts contained no content or updates.

The most common type of content shared by participants on Facebook contained a combination of commodity market and general information about the cooperative ($n = 22, 39\%$) (see Table 3). This was followed by accounts containing a combination of commodity market, general

information, and personal use topics (obituaries, fundraisers, community news, etc.) ($n = 13$, 23%) and accounts containing personal use information only ($n = 13$, 23%).

Table 3

Type of Content on Facebook ($n = 57$)

Content Type	Frequency (n)	Freq. Percent (%)
General Information & Commodity Markets	22	39%
Personal Use Only	13	23%
General Information, Commodity Markets, & Personal Use	13	23%
No Content	5	9%
Commodity Markets Only	2	4%
General Information, Commodity Markets, E-Commerce & Personal Use	1	1%
Commodity Markets & Personal Use	1	1%

User-maintained websites. Of the user-maintained websites found, only 40% ($n = 12$) had a copyright date of 2021, indicating it had been updated or created within the year of data collection. However, 30% ($n = 9$) of the sites reported no copyright date making it challenging to determine how recently they were created or updated. The most common types of content found on these sites included a combination of commodity market information and general information about the cooperative ($n = 27$, 90%). Commodity market information included current market bids for cash crops such as corn, wheat, sorghum, and cotton.

Phase Two – Cooperative Manager Interviews

Communication Strategies. All six interview participants noted they shared the responsibility of updating their social media and online communication tools with other individuals within the cooperative. A majority ($n = 4$, 67%) reported sharing this responsibility with their office manager, while the other two ($n = 2$, 33%) reported also sharing this responsibility with various cooperative employees. No participant had online or social media management listed as part of their official job description. Instead, social media use has been adopted and implemented as a communication tool along the way. When asked how social media adoption happened within their cooperative, Trevor responded, “We saw the move happening, and it was hard not to fall into it [social media]. There’s a push, and whether we like it or not, it’s a form of business now.” All participants ($n = 6$) also reported spending approximately one hour or less per week updating their online presence. According to Harvey, “We just kind of do it as we go, as we need to do it. I don’t know about an hour [per week].”

No participants had a social media or online communication strategy in place, and only one ($n = 1$, 17%) had any sort of goal related to social media even in mind. This goal was to post one Facebook post per week, which they admitted they often fell short of. As Trevor explained, “What we try to push – and we haven’t done a great job, and I haven’t encouraged staff – is a post a week.” Other participants admitted to not even thinking of setting goals for their online communications. Harvey noted this by saying, “Never thought about a goal until now.” This was echoed by Daniel who said, “No, nobody’s setting goals for that sort of thing.”

Additionally, none of the participants noted that their cooperatives had a separate line item in their budget for communication, nor social media specifically, outside of small budgets mentioned for print and digital advertising in their local communities, and they did not see a need for it at the time of their interviews. Louis stated, “No, it just falls under our advertising budget. If I thought we needed a separate item, I would create it, but I don’t.” Similarly, Trevor said, “I don’t really see a need. It would fall under our advertising package. I know a number there, and that’s what I look at.”

All participants ($n = 6$) mentioned using Facebook as their primary social media platform when communicating information about their cooperative to their members, and most ($n = 5$, 83%) noted they selected Facebook to communicate with their members because of its existing userbase. Half of the participants ($n = 3$, 50%) said they were comfortable using Facebook for their cooperative due to prior personal experience with the platform. According to Louis,

It’s what most people are gonna go to use. The demographic that we’re after is going to be middle-aged, you know, either the farmer...or his wife. So, Facebook is accessed by the largest swath, what I would call our customer base.

Mike provided a detailed account of why he adopted Facebook for his cooperative. He said, ...if you’re not telling your story, then somebody else is, and they aren’t going to get it right because they aren’t part of your industry. That made a really big impression on me. So, I did a video, just walking through the ginning process from the module feeder, following the cotton all the way through to wrapping and tagging the bale and kicking it outside. I had 5,500 views on that video! It dawned on me at that point that this [Facebook] was a good medium for us to tell our story. And not just to our producers and membership, but also to our community about what we are doing here.

When asked about the personal content posted to their cooperative social media accounts, participants noted this was a way for them to engage with their local communities. They emphasized the need to foster a sense of community pride between the cooperative and its members in the community. Trevor explained, “It makes them feel welcome like they own this thing because they do. I think our communication with those folks and our biggest asset is serving our customers and serving them personally.” Louis said, “...know that your membership is not your only goal. The membership is the bread and butter of our organization, but we also focus on the community...”

Only four of the participants’ cooperatives ($n = 4$, 67%) had a website, and they found it useful for their cooperative. However, as Louis noted,

The investment today will not pay in the near future...I’m investing 10 years, 15 years, down the road...It’s an added service most cooperatives don’t have. I’m investing the money now to pay me back in 10, 15, 20 years.

Mike said he rarely updated his website and instead relied on Facebook. He explained, I see more action and more activity on Facebook than I am on the website. Most people come to the Facebook page to follow us than ever went to the website. So, I’ve kinda let the website go by the wayside, and I probably shouldn’t have done that...Maybe if I were

a bigger supply co-op, I would probably maintain the website more. We focus mainly on Facebook because it is so much quicker and easier for us to post updates. The other two participants ($n = 2$, 33%) did not see a need to invest the time or money into running a website due to their small size.

Although this study focused on using social media platforms and online communication channels, all participants mentioned they rely heavily on more traditional communication methods such as texting, phone calls, face-to-face communication, newspapers, print ads, email, and radio. Harvey explained, "Texting has become really big. I mean, I text a lot. I do a lot of my marketing through texts with my farmers."

Perceptions of Social Media Platforms and Online Communication Channels. While all participants noted they felt online communication and social media use were important, half of the participants ($n = 3$, 50%) expressed reservations when asked if they believed their current social media platforms were the best choice for their cooperative. Daniel said, "I think with anything you put on social media, there have to be reservations." Participants stated not feeling like they fully understood how to use social media and struggling to create relevant and well-worded posts as the main reasons for their reservations. As Trevor explained,

...sometimes I'll sit there, and I'll draw it all up, and I'll look at it. And I'll say, "I'm not sure." I ask myself, is there a different word I could put there? Is there anything I left out? Am I going to step on anybody's toes? Am I putting enough information in there? Am I putting hashtags in? Oh, I am telling you, I have reservations.

Four of the participants ($n = 4$, 67%) said they had reservations about expanding their efforts to other social media platforms because they felt managing their current social media was challenging enough. Daniel noted, "I think if we could just get all of our people to Facebook and really start focusing on that, I think we would be doing great. That's challenging enough for us." Trevor added,

We honestly have a hard enough time keeping up with Facebook and Twitter; I don't know if I would even look forward to another [platform]. Maybe at some point in time down the line, we might need to consider something different.

Most participants reported they receive little to no feedback from their members in response to their social media and online communication efforts. Only three ($n = 3$, 50%) reported ever having a member mention that they saw something on Facebook during an in-person conversation, while the other half ($n = 3$, 50%) have never received any feedback from their members related to their online communication. Daniel explained this lack of feedback was concerning. He said, "We don't get feedback; it's relatively stagnant. It's sad."

Half of the participants ($n = 3$, 50%) believed they were doing a good job communicating with their members online but felt they could do better. Jessica said, "We do fair. I think we could do better, but we do fair." Harvey echoed this, saying, "We're improving. I'll put it that way. I don't think we're doing that bad, but I think there is a whole lot of improvement we can do." One participant ($n = 1$, 17%) felt they were not doing a good job because they did not dedicate enough time to communicating online. Trevor explained, "No, I just don't feel like we take

enough time. And it's taking enough time, taking the appropriate amount of time in a week, and putting out there things that will potentially benefit our co-op."

To gain insight into the cooperative managers' perceptions of using social media platforms and online communication channels to communicate with their members, participants were asked to identify their cooperative's strengths and weaknesses regarding their communication efforts. Strengths discussed by participants focused on more traditional communication methods, and no participants noted strengths related to online communication efforts. Strengths mentioned included the managers' relationship with members, frequent face-to-face communication, word-of-mouth communication, the cooperative's relationship with their local communities, and young management.

Two weaknesses participants discussed included non-technologically savvy members and members refusing to adopt new technology and communication tools, which they felt acted as deterrents for online and social media efforts. As Daniel noted,

I think our weaknesses are the receptors. They're [cooperative members] unreceptive to new things and new technologies and don't seem to jump on that. We would go through the efforts if I thought somebody was watching if somebody was paying attention.

If given the opportunity to change how their cooperative communicates with their members, four participants ($n = 4$, 67%) wished they received more feedback from members, and two ($n = 2$, 33%) wanted to see their members adopt technology faster.

All participants expressed a need for research to explore the communication preferences of their members, which was not currently being done by any of the cooperatives they worked for or with. Additionally, all participants added comments speaking on the importance of communication within the cooperative industry, including both traditional and newer media methods. Louis stated, "Social media is a highly underutilized tool. It is important to learn how to communicate with them." Similarly, Mike said,

I think the role that communication plays is just going to grow...we've got to communicate to our producers, number one, what they're a part of, and number two, let them know what is going on here at their cooperative. It's just too important not to.

Conclusions/ Implications/Recommendations

The agricultural commodity cooperatives in this sample have been slow to adopt and integrate social media and online communication channels into their communication strategies. Facebook, however, was found to be the most popular social media platform used by these cooperatives which is consistent with recent statistics identifying Facebook as the world's most popular social media platform for business and personal use (Statista, 2021; Statista 2022a; Statista 2022b). Cooperative managers interviewed in this study believed it was worthwhile to put communication efforts into using Facebook because it has the most extensive existing userbase and is where their target audiences are most active. It is reasonable to conclude other cooperatives managers in Texas may share their sentiments because Facebook was found to be the most widely used online tool by the agricultural commodity cooperatives in the communications audit in Phase One of this study. Agricultural commodity cooperatives should continue using Facebook regularly to communicate online with their external publics. Regular

communication efforts online would allow cooperatives to remain engaged with their external publics and to further share their cooperative's story in meaningful ways.

Outside of Facebook, website, electronic newsletter, online magazine, and blog usage was surprisingly low compared to previous studies examining the use of these communication tools with different agricultural audiences (Brown et al., 2013; Georges & Caleman, 2021; etc.). The participants simply stated they did not see a need because their members have never expressed interest in these tools. The low use of other popular social media platforms – such as Twitter, YouTube, and LinkedIn – was also noted as these have been found to be popular among agricultural and professional audiences (Schmukler, 2020; Shaw et al., 2015; etc.). This may be contributed to the unfamiliarity of these tools with the cooperative managers tasked with their implementation. Cooperative managers identified other platforms as "confusing" and "overwhelming" and were unsure how to use these platforms for personal or business use. Some cooperative managers even found Facebook challenging enough and did not want to attempt to learn a new platform until they felt comfortable using Facebook regularly. To expand on their ability to effectively communicate with a variety of audience members – and to ensure no audiences are left out of the conversation – the use of other online tools should be explored. Training may be needed to help them feel more comfortable in implementing and expanding these strategies for their organizations.

The sharing of personal information (obituaries, fundraisers, community news, etc.) on cooperative Facebook pages was surprising at first; however, it became clear following the interviews with cooperative managers that these posts emphasized a sense of community pride and allowed the cooperatives to act as a bullhorn for community events or news further building ties and relationships within their local communities. Building relationships with external publics is a core foundation of the Organizational-Public Relations Theory, and as Ledingham and Bruning (1998) concluded, when organizations demonstrate involvement or commitment to their community, loyalty to the organization is increased among all external publics further increasing their influence. Replication of this study in the future should include in the codebook a code created and assigned to community interest topics. Distinguishing community involvement content from information that is truly irrelevant to the cooperative will allow researchers to more clearly identify where and how cooperatives are strengthening their relationships with their community.

The lack of communication strategies, goals, budgets, or personnel found in this study is also of concern. Without clearly defined strategies or goals, cooperatives have no way to measure their success or determine if their efforts are worthwhile. Additionally, a lack of consistent and frequent communication does not allow them to serve their members or build relationships in meaningful ways. As Ledingham and Bruning (1998) suggested, an organization's relationship with its external publics can only be improved if the communication is mutually beneficial. Communication efforts of cooperatives should focus less on traditional tools used to "talk at" the cooperative's external publics, as Berthon et al. (2012) described, rather than "talk with" them. Cooperative managers should heavily consider reallocating resources and personnel to focus on communication efforts that allow them to "talk with" their external audiences so these groups feel their opinions and thoughts are valued further increasing their loyalty to and overall perception of the organization (Berthon et al., 2012; Kietzmann et al. 2011). Dedicating

resources to the development of improved communication strategies would provide opportunities for improved engagement with cooperative members, stakeholders, and the public.

Many recommendations for research can be made based on the results of this study. A replication of this study with a broader sample and expanded interview protocol would provide more depth and insight to these findings. Research to explore communication preferences of cooperative members was not currently being conducted by any of the participants in this study and would be essential for helping them ensure they are reaching their audiences effectively. Additionally, gathering feedback from cooperative members on the use of online communication tools would also help gain insight into possible improvements. Finally, exploration of the impact of cooperatives' online communication efforts is needed to better understand and strengthen the need for these endeavors. There is still much work to be done to explore these topics further. This study provides valuable insight into how agricultural commodity cooperatives in Texas utilize social media platforms and online communication channels, an area where previous literature is limited. There is great potential for researchers, cooperative managers, Texas Agricultural Cooperative Council (TACC), and social media strategists to improve two-way communication between agricultural commodity cooperatives and their external publics further expanding their reach within the industry.

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The Rainbow Owl: A Phenomenological Analysis of LGBTQ+ Agricultural Education Teacher Experiences

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Abstract

The purpose of this study was to collaborate with School-Based Agriscience Education (SBAE) teachers who identify as LGBTQ+ in an effort to examine the unique interactions between their chosen career and their sexual and/or gender minority identities. This phenomenology utilized data from semi-structured interviews with individuals who had taught at least one year in the SBAE classroom, identified as LGBTQ+, and were employed to teach SBAE or professionally supervise an SBAE teacher. Participants consisted of six gay men, one lesbian woman, and one transgender man from eight different states across the U.S. Findings indicated three themes: 1) the race from closeted to proud, 2) avoiding state-level SBAE involvement, and 3) the importance of being out. While the findings in this study are not generalizable, we begin to uncover the hurdles that our LGBTQ+ SBAE teachers face. Findings from this study have the potential to inform policy and culture reform in an effort to create more inclusive and equitable spaces for SBAE teachers from underserved communities. Of particular note, individual state SBAE associations should be particularly prompt in assessing these issues since these have been identified by participants as particularly egregious when it comes to a lack of inclusion. This manuscript is based on data published in the Proceedings of the North Central AAAE Conference, Gregg & Bowling, (October 7, 2022).

Introduction

Relating to School-Based Agricultural Education (SBAE), many stakeholders, including the National FFA Organization (2019) have built efforts toward fostering diversity and inclusion. While many studies have been conducted on various forms of diversity within SBAE, individuals who hold an identity that's considered a gender or sexuality minority (or those who are LGBTQ+) are underrepresented in the literature, even though there is "clear practitioner demand" for such research (Murray et al., 2020, p. 297). The existing literature has begun to describe how LGBTQ+ teachers and agriculturists interact with the world around them as it relates to their lives and careers. Of note, the literature identifies four broad themes of research related to LGBTQ+ teachers' lived experiences: Heteronormativity, Coming Out, School Environment, and the cultural expectations of teachers serving as role models to students.

Heteronormativity

Heteronormativity is the concept that all social relations are imbued with meaning in the context of gendered social agents. Within these social relations, those agents whose roles match with their associated gender are given communal priority over those who do not (Jackson, 2006). When these views are pervasive within a cultural setting to the point where discrimination based on sexual orientation is justified, this is known as homophobia (Morin & Garfinkel, 1978). In a study completed in a rural community in Australia, gay and lesbian participants consistently

experienced homophobia within all sectors of their lives, including the workplace (Gottschalk & Newton, 2009). In Great Britain, a study found that young gay men were more concerned about constructing an identity while navigating a homophobic society than with their sexual health amid the concerns of HIV (Flowers & Buston, 2001).

In an extension of rurality, gay men who work within the agricultural sector in the U.S. report experiencing significantly more workplace homophobia than those who do not (Steede & Parent, 2017). When dealing with these issues, navigating homophobic societies can have mental health consequences, according to a study that established a relationship between psychological distress and experiencing internalized homophobia, stigma, and prejudice (Meyer, 1995). In navigating homophobic cultures, queer people, particularly teachers, often must separate their “private” and “public” selves, giving an experience of living two separate lives as a form of self-preservation (Bower-Phipps, 2017; Ferfolja & Hopkins, 2013; Gray, 2013; Griffin, 1992; Jackson, 2006; Mayo, Jr., 2008; Olson, 1987).

Coming Out

When queer teachers do decide to combine these public and private lives by “coming out of the closet” at school, each experience is unique and falls somewhere on a continuum which can be found in more detail in Figure 1 (Griffin, 1992). Before coming out, many queer teachers cited safety as a critical issue to avoid the process in the workplace altogether; these teachers particularly stated using the conservatism of a community as a sign of danger (Bower-Phipps, 2017; Griffin, 1992). When they did decide to come out, teachers often sought a “safe” form by coming out to a coworker or administrator first (Gray, 2013). By coming out, queer teachers were able to find a greater sense of job satisfaction, a higher sense of authenticity, and more confidence in their teaching, and were empowered to actively work against homophobia, heteronormativity, and negative stereotypes about queer people in their schools (Flowers & Buston, 2001; Gray, 2013; Haddad, 2019; Jackson, 2006). Those teachers who were able to come out in the context of the subjects they taught had the greatest success, while those who taught either elementary school or a subject that includes teaching concepts of sex (like health and science) had more difficult experiences (Jackson, 2006; Tompkins et al., 2019). This is likely due to communities with large religious populations reducing “sexuality” to “sexual behavior” rather than acknowledging that sexuality also includes emotional and relational dimensions (Yip, 2010). This isn’t surprising when you consider that sexual minority identity development has historically been understood as “fundamentally defined by one’s sexual partners” (Bishop et al., 2020, p. 15). However, the first probabilistic LGBTQ+ study on sexual minority identity development has shown trends indicating that sexual identity development is happening both earlier and faster, pushing identity development milestones earlier into adolescence, *before* individuals may have any sexual experience (Bishop et al., 2020).

School Environments

Teachers who taught in high diversity environments with a progressive school atmosphere reported that it was easier to come out in the workplace (Bower-Phipps, 2017; Ferfolja & Hopkins, 2013). However, when these factors associated with positive school atmospheres are absent, teachers reported significantly higher levels of homophobic bullying by students,

administrators, and parents (Dykes & Delport, 2018). In addition, administrators were often leaders in this context; when they weren't supportive, the process of coming out at work was more difficult for teachers (Haddad, 2019; Jackson, 2006; Tompkins et al., 2019). In addition, a survey of teacher candidates in Texas noted that participants had a moderately negative attitude toward gay and lesbian populations (Wyatt et al., 2008).

Regardless of their level of “outness”, queer teachers recognized, reported, and addressed homophobic comments at school at significantly higher rates than their straight, cisgender colleagues (Meyer et al., 2015). Particularly representative of heteronormative school cultures is gossip among students and teachers alike when teachers do not conform to gender norms; this can lead to “othering” of queer teachers and facilitate homophobia via an unwelcoming environment (Smith & Smith, 1998; Tompkins et al., 2019).

Figure 1

LGBTQ+ educators’ identity management strategies.

Closeted	Passing	Covering	Implicitly Out	Explicitly Out	Out
	Lying	Censoring	Telling truth w/o Labels	Affirming LGBTQ+ Identity	Out to school community
Out to no one	I assume you don't know.		I assume you know.	I know you know.	
	Seen as Heterosexual	NOT seen as LGBTQ+	Maybe seen as LGBTQ+	Seen as LGBTQ+	
FEAR ← SEPARATION ←				Personal/Professional Self	→ SELF-INTEGRITY → INTEGRATION

Note. Adapted from Griffin (1992).

Queer Teachers as Role Models

When positive school environments exist, tasks of teaching about queer issues, speaking up against heteronormativity, and serving as role models for queer students seem to fall quickly to LGBTQ+ teachers who are explicitly out (Tompkins et al., 2019). One contributor to this could be that LGBTQ+ teachers are more likely to report unsafe environments for *any* marginalized population than their cisgender/heterosexual (cis/het) colleagues do (Tompkins et al., 2019). In addition, LGBTQ+ teachers reported that few cis/het educators were aware of the concept of heteronormativity, or if they were aware, were less willing to actively challenge it (Meyer et al., 2015).

Even when they weren't out, gay teachers still took it upon themselves to “monitor” students who were out or that were rumored to be gay in order to publicly protect them, or to privately provide them advice (Mayo Jr., 2008). This (pre/ab)sence of such a “gay guardian teacher” could be an important factor in the sexual minority identity development of LGBTQ+ individuals from areas of low population, especially since studies of rural gay men and women have reported

strong feelings of isolation in addition to a strong felt need for queer role models in their communities (Flowers & Buston, 2001; Gottschalk & Newton, 2009).

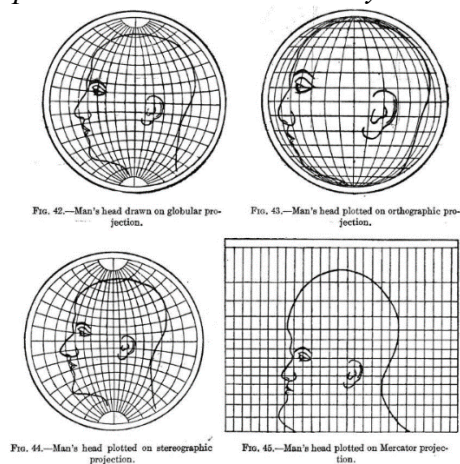
Theoretical Lens

Queer theory was the theoretical lens utilized in this study’s design and analysis. Queer theory in and of itself has a very rich history in being utilized to dissect concepts that go against “normality” (Jagose & Genschel, 1996). Because of this rich and varied history, queer theory is often oversimplified and defined as the study of “otherness”, otherwise known as “queerness”. This oversimplification is problematic because it posits queerness as an essential quality rather than a subjective attribute only understood through the lens of the ever-shifting experiences of the subject (Dilley, 1999). This subjective definition of queerness, rooted in postmodern constructionism, is best understood when compared to its opposite counterpart of “normal” – or the majority practice, idea, or opinion.

In scholarly research, queer theory tends to lend itself to three basic purposes: examining the experiences of those who are not cis/het, juxtaposing the experiences of these individuals with what is considered “normal”, and analyzing why these experiences are not considered “normal” (Dilley, 1999). To visualize the use of queer theory for the three purposes listed above, it can be helpful to visualize different map projections. Because we live on a 3-dimensional globe, we cannot accurately represent the earth’s surface on a 2-dimensional surface, such as a map. Because of this, cartographic scholars have proposed different ways to represent the globe as a map, but regardless of the approach you take, you will never have a map that’s perfect. To illustrate this dilemma, Figure 2 reproduces an image first published in a cartography textbook in 1921. This figure represents how four different map projections will provide different inaccuracies when the same shape (a face) is projected. When examining these changes between projections, one could note that the greatest changes between the four examples occur in the *margins* of the map, far away from the *central focus*.

Figure 2

A comparison of various map projection errors. Published in Elements of map projection (1921) Special Publication No. 68 by the U.S. Coast and Geodetic Survey, Department of Commerce.



To bring this analogy back to queer theory, when we examine society as a whole, the *central focus* will always be the majority “norm” which often means that the *margins* will default to be the *other*. Queer theory seeks to directly address this by *re-centering* the focus point of our proverbial map – re-shifting the margins to the center, so we can better understand these marginal experiences *outside of the norm*.

This research followed the first tenet proposed by Dilley (1999) to form a greater understanding of the lived experiences of gender and sexuality minority SBAE teachers. Additionally, queering as an analytical tool for constructing knowledge can be leveraged to identify meaning units outside of traditional lenses of understanding (Halperin, 2003). This lens provided the tools necessary to 1) center the inquiry around *the participants’ lived experiences on the margins of the norm*, and to 2) identify how LGBTQ+ SBAE teachers queer their own understanding of the world through their experiences.

Purpose and Research Questions

Our purpose was to identify the unique challenges LGBTQ+ SBAE teachers face due to the intersection of their career, rurality, and gender and sexuality minority identities. This study is guided by the following research questions.

- 1) How do LGBTQ+ SBAE teachers identify with and/or dissociate with the larger SBAE community?
- 2) What are the issues facing LGBTQ+ SBAE teachers related directly to their profession, their gender and sexuality minority identity, or both?
- 3) To what degree do LGBTQ+ SBAE teachers face homophobic prejudice?

Methods

This research is a phenomenological study (Moustakas, 1994) whose central phenomenon is the lived experience of SBAE teachers who identify as LGBTQ+. We used a constructivist lens as each participant’s experience relating to gender and sexuality is constructed through unique social interactions that may or may not be shared (Creswell & Creswell, 2018). This is especially important to note since queerness can only truly be understood through subjective experiences relating to society’s implied normality and otherness.

As researchers, we must reconcile our own identities and biases throughout the research process. The research team consisted of a doctoral student who identifies as Queer and is perceived as a cisgender man and their faculty advisor who identifies as cis/het, both employed by a large midwestern university. Both researchers have 4 or more years of experience teaching in the SBAE classroom and have been heavily involved with some of the organizations mentioned directly by participants. Due to the importance of personal identity when conducting qualitative research, we purposively identified our biases when possible and attempted to bracket them within the research (Creswell, 2013).

Multiple strategies were employed to ensure trustworthiness and authenticity of the present study. Of note, Elo et al’s (2014) recommended checklist for improving trustworthiness was

referenced at all stages of study design and analysis. Of note, strategies that were employed primarily consisted of peer debriefing with other LGBTQ+ graduate students and faculty members with knowledge of qualitative research, and member checking with participants to ensure their quotes were not misinterpreted. The second author oversaw recruitment, data collection, analysis, and reporting.

Paradoxically, one of the strengths of the authenticity of this research is also one of the largest concerns as well: the noted lack of specific detail of participant experiences. While this lack of detail was purposive in an attempt to mask participant identities, it also limited the analysis that could be reported herein that relates to age and dating experiences within the wider SBAE community. Additionally, there were three participants who shared some extreme experiences of lived homophobia and homophobic attacks that they then later asked to be removed from the analysis. All of these requests were addressed and confirmed with participants when member checking the results.

Participants

For this study, we sought SBAE teachers who (1) identified as LGBTQ+, (2) had taught in the high school classroom for at least one full year, and (3) were either presently employed as an SBAE teacher – **OR** – were employed in a direct supervisory position over at least one practicing SBAE teacher. The addition of “supervisory position” clause was added via IRB amendment due to three interested participants reaching out to the research team to participate and not qualifying solely because they did not presently teach in the SBAE classroom but were still involved in the profession. These three interviews provided confirmation that data saturation was met after the first four interviews, at least as it pertains to the perspective of gay men.

Participants were sampled via snowball sampling by notifying potential participants through social media groups and list-serv emails designated for SBAE teachers. Particularly, communications were worded in a way that encouraged interested participants to contact the researchers directly in an effort to maintain individual privacy. Potential participants and other third parties who had viewed the call for participants were encouraged to forward the call on to those whom they knew fit the requirements, with a particular emphasis that nobody should contact the research team with names other than their own. As participants identified themselves, data were collected by semi-structured, extensive interviews asking participants to describe their experiences in the SBAE profession. A summary of study participants can be found in Table 1.

All interviews followed an interview protocol that was IRB-approved. Interviews occurred over Zoom, and included interview questions like “how welcoming would you describe the agricultural education community?” and “what would you describe as the biggest professional obstacles you face because of your LGBTQ+ identity?” Each interview averaged approximately 40 minutes, *except* for Eric’s, whose interview lasted for almost two full hours. Following each interview, the recording was transcribed, line-by-line coded, and analyzed using the constant-comparative method to determine any preliminary themes that arose (Glaser, 1965). Findings and codes were both peer- and member-checked in an effort to preserve the validity of the findings. While the perspectives of the final three participants were greatly valued, these interviews were

used for confirmatory analyses, particularly because no new categories of codes arose from the inclusion of these data.

Table 1

Study participants and relevant contextual information

Pseudonym	Location	Identity	Career Stage
Amber	Midwest	Lesbian Woman	Early
Bryce	Pacific Northwest	Gay Man	Mid
Cameron	Great Plains	Gay Man	Mid
Dane	Southeast	Gay Man	Early
Eric	Deep South	Transgender Man	Late
Franklin*	Great Plains	Gay Man	Mid
Gary*	Southeast	Gay Man	Mid
Harold*	Great Plains	Gay Man	Mid

Note. Details are purposively vague in an effort to preserve participant identities.

* = served in SBAE supervisory role at time of interview

The coding process began with a cycle of structural coding, notating quotes of interest from the participants in order to collect like quotes together (Saldana, 2016). From this first cycle of coding, three general groups of quotes were collected: self-reflections, interactions with other adults, and interactions with students. After quotes were collected through this coding process, the second round of coding utilized a pattern coding method in order to organize quotes and identify any major themes from the data (Miles et al., 2014). Through this process, three themes were identified from the participants.

Findings

Overall, findings from this study indicate that LGBTQ+ SBAE teachers face challenges that are explicitly and implicitly tied to the intersection of their chosen careers and their gender or sexual minority identity. Of note, three themes arose from the data: 1) A three-hurdle race from closeted to proud; 2) Taking the elevator to avoid the “state” level of SBAE; and 3) Affirmation and representation – the importance of being out.

Theme 1: The three-hurdle race from closeted to proud

Our first theme arose from participants detailing similarities in the varying paths they took in coming to terms with their minority identity, reconciling this identity with their previous judgments toward gender and sexuality diversity, and finally becoming *proud* of their identities. This process was particularly found to be repeated thrice in the stories of most participants with their coming out stories. Most participants referenced three distinct settings where they had to work through the coming out process: “private,” “public – school,” and “public – FFA.” While the private arena was not of particular interest in this study, participants indicated that their struggles lie primarily in the public-facing arenas of school and the FFA. While the sheer number of “coming out” moments shared varied by participant (Eric told *eight* different coming out stories, while all other participants told two to four), the public/private dichotomy described in previous research (Bower-Phipps, 2017; Ferfolja & Hopkins, 2013; Gray, 2013; Griffin, 1992;

Jackson, 2006; Mayo, Jr., 2008; Olson, 1987) is very apparent in our participants' experiences. Of note, Eric even shared himself that he had so many coming out stories because he came out twice: the first as a lesbian woman in his young adult years, and the second when he came out as a heterosexual transgender man.

When comparing their experiences across these three arenas, participants indicated different levels of acceptance that were present. For instance, in Bryce's coming out journey, he faced pressure to stay closeted at the first school he taught at. However, he found that as he moved teaching environments, they became more and more welcoming. Of note, in his current position, Bryce shared that he's "proud now, especially since I've moved schools". While Bryce indicated that his current school was more accepting, it should be noted that any further description of the differences between the two schools would most likely lead to this participant's identification. Because of this, this detail is not included here.

Ultimately, a change in acceptance was a sentiment shared by the other four individuals who had changed schools while teaching SBAE. Cameron, who had not changed schools, felt that his experience was much more subtle: "I was out in life but wasn't out at school until the kids started noticing I didn't have a girlfriend around year three." Students noticing their SBAE teacher's relationship status (or lack thereof) was another common topic between participants. While it was not initially identified in all interviews, member checking confirmed that all participants in this study had, at one point or another, had to field a question from a student or community member about why they **didn't** have an opposite-sex romantic partner – another example of heterosexuality serving as a "default" norm that is implicitly applied to others.

The third and final setting of coming out in this theme arose from teachers expressing elevated caution when attending events within the larger SBAE community where teachers and students from other schools were potentially unaccepting of those who identify as LGBTQ+. At one point, Dane expressed that he was worried about these spaces because "You know, you just have to be careful around [SBAE teachers], you don't know if they're just *yee-haw* or if they're also *Republican*." This association between conservatism and a lack of tolerance was alluded to by multiple other participants as well: of note, all three participants who served in supervisory roles (Franklin, Gary, and Harold) mentioned President Trump's address at the 2018 National FFA Convention at one point in their interview. However, since none of the three were *at the address* and had only heard of it through secondhand means, each interview was shifted toward the participants' *own* experiences. While the topic was not addressed further in this study, it's still important to note that this indicates the existence of at least one major event in the SBAE world that had a negative impact on LGBTQ+ teacher experiences. For an event to be important enough that three SBAE supervisors note its impact on younger teachers unquestionably warrants further investigation.

When it comes to coming out, Eric definitely had a much different perspective than his sexuality minority counterparts. As a transgender man who previously identified as a lesbian woman, he's had to encounter the coming out process twice in his rural community. Eric had taught at his current school as a science teacher for over two decades before switching subjects to agricultural education. Because of this unique situation, he shared multiple stories that involved his students with their older siblings, or even parents, who were students of Eric's when he was a female

presenting science teacher. Of note, Eric shared a queering of his own teaching history in this story, referring to his first two decades of teaching as “back when I taught in drag”. This phrasing is interesting because it indicates where Eric is applying his own approach to the idea of what a “teacher” looks like. When asked to explain this idea further, he shared that he “dressed the part” of a female teacher, even though he didn’t have the words to express his discomfort with presenting as female at the time. Because of his long-standing history in his current community, and his lack of experience with SBAE in general before his current position, Eric’s coming out followed a traditional Public/Private dichotomy (twice), without the “Public – FFA” arena. Eric noted that within the SBAE community, he keeps himself at a distance primarily because he doesn’t see much of a need to interact.

Theme 2: Taking the elevator to avoid the “state” SBAE level

Our second theme details participant experiences surrounding the stratified structure of SBAE organizations at the national, state, and sub-state levels. This theme arose when it became clear participants actively chose to participate in SBAE teacher organizations at the national and sub-state levels, but **not** the state level. Particularly, most participants cited that exclusion from other SBAE teachers was the primary reason for this. While this was not the case for Eric, as described in the previous theme, five participants (four current teachers and one supervisor) all shared this sentiment.

Cameron, from a Great Plains state, said that he was ‘extremely’ welcomed within the National Association of Agricultural Educators (NAAE) but could not say the same for his state chapter of the association. With his experiences in the Southeast, Dane echoed this, saying that while he participated in events with The National FFA Organization, he was “not as involved in the [state] ag teacher organization” and went as far as to label himself as a “lurker” at statewide SBAE events due to his discomfort with other SBAE teachers. When asked if this was extended to his regional community, he shared that “well...they aren’t *not* accepting.” When asked for further detail, Dane shared that this statement was about his *sub-state* SBAE cohort (the schools in the same and surrounding counties) as being more accepting than the *statewide* SBAE community writ large. When asked for specific examples of actions from other SBAE teachers, Cameron relayed that it wasn’t necessarily the *actions* that made him feel uncomfortable, but the *lack of actions*, going on to share that “people can be a little standoffish sometimes. When it comes to [the state chapter of NAAE], especially.” He shared that he felt he was purposively left off of multiple committee communications at *least* three times. When asked why he felt it would be intentional, Cameron shared that it could be either because of his sexuality or because other teachers felt intimidated by his FFA chapter’s success. Regardless of the reason, Cameron was very positive that it was an intentional action because it had happened “too many times for it to be a coincidence”.

Again the outlier, Eric, because of his unique teaching history, had never particularly sought involvement in any SBAE teacher associations. An extension of his lack of “hanging” with SBAE teachers, he only felt that he never “drank the Kool-Aid” because he was an “established teacher” already when he took over his school’s SBAE program. This could be the case, but if so, indicates a potentially troubling phenomenon with non-traditional SBAE teachers if they don’t find value in their professional organizations.

Theme 3: Affirmation and representation – the importance of being out

The final theme from this study emerged from participants believing it was important to be “out” in their positions, and the resulting successes and challenges they faced because of their outness. On the positive end, participants found that their outness had direct effects like helping them build rapport with their students. Participants noted that this increase in rapport was particularly noticeable with their repeat students who also served as officers for their local FFA chapter.

Not an outlier in this theme, Eric shared that he doesn’t “avoid it anymore...like I did when I started. If the students have questions, I answer them. Honestly, I appreciate it” indicating that he appreciated the candid conversations that almost always led to a deeper student understanding. Bryce noted that “I wanted to be the teacher I needed when I was that age” which was a thought echoed by the other three gay and lesbian teachers. Through being out, our participants were able to instill positive changes in their schools. These changes included direct interactions with students such as being asked specific questions about being LGBTQ+, and teachers noting how their classrooms were increasingly labeled as “safe spaces” by students after coming out. Interestingly, these labels came from both SBAE students AND their friends who were not in SBAE classes.

Some of these conversations even provided students with an opportunity to rethink their heteronormative assumptions and biases. Eric provided many examples of such student conversations, but one example included a teaching moment that he felt particularly proud of.

Student: *My sister and I had this argument last night. She said that she had you as a teacher and that you were a girl. I told her she was wrong, and she goes “I’ll bet you \$5!” so I’m here to win the bet.*

Eric: *Do you have \$5 in your pocket?*

Student: *Yessir.*

Eric: [With a wry smile and a tinge of sarcasm] *No, you don’t, that’s your sister’s now.*

This conversation serves as a bite-sized example of Eric taking an indirect approach because “sometimes you have to take it a little more gently and smooth”. As exemplified here by his (perceived) quick wit, Eric is used to fielding questions like this, and in referencing the continuum of LGBTQ+ Educators’ Identity Management Strategies (Figure 1), the quotes above point to Eric being much closer to “explicitly out” with his identity as compared to the younger, sexuality diverse teachers who described situations that pointed more to an approach closer to “covering” within the school environment.

Unfortunately, being out ultimately came with an explicit downside for some participants. As these teachers gradually moved from “closeted” to “out”, they found that students, coworkers, community members, or other adults within SBAE spaces would raise issues with them and/or treat the teachers as a scapegoat. Eric shared a conversation he had with his principal when he

came out, stating “I told him I’m not going to be your poster child...do *not* send children to me to answer all their questions.” When questioned further, Eric detailed that while he initially felt worried for himself and the fear of losing his teaching certificate, these fears have only increased in the last year or two, citing the large number of “Don’t Say Gay” bills present in a variety of state legislatures at the time.

An example of being used as a scapegoat, Amber registered a transmasculine (assigned female at birth) student as male to attend FFA camp under his identified gender – a decision that was made by her administration. It wasn’t until after the camp session began that she was confronted by the camp director and told to “keep [your] politics and lifestyle out of FFA” – positing the “blame” on her shoulders when the student was outed (either accidentally or purposively – Amber and her student were both unsure how they were outed). It should be noted that the overall distinguishing factor of this theme from the other two is the sense of *potential and actual consequences* of being out – regardless of whether these consequences are perceived as positive (i.e., affirmation for their potentially LGBTQ+ students) or negative (i.e., disrespect and blame in response to a decision that was out of their control).

Conclusions and Discussion

While we cannot generalize these findings to the experiences of all LGBTQ+ SBAE teachers, this study begins to document this community’s experiences. The findings here indicate that participants 1) felt as if there were three different “coming out” processes related to the intersection of their identities and career; 2) participated heavily in SBAE organizations, except for the state level; and 3) felt that being “out” as a teacher was important (and dangerous) for multiple reasons.

In evaluating the transferability of findings from this study, we see many trends that mimic those found within the existing literature. Of note, participants here alluded to both public and private “selves” that have become more integrated as they’ve moved along their teaching career. This mimics the separation of selves in many other studies examining LGBTQ+ teachers employ this separation as a form of self-preservation (Bower-Phipps, 2017; Ferfolja & Hopkins, 2013; Gray, 2013; Griffin, 1992; Jackson, 2006; Mayo, Jr., 2008; Olson, 1987). We also saw similar benefits and drawbacks related to teacher “outness” that have been documented in other populations (Mayo, Jr., 2008; Meyer et al., 2015; Tompkins et al., 2019).

Where our sample deviates from the existing literature is the identification of issues and specific arenas that are tied to participant peers and professional organizations. More research is needed to determine if SBAE teachers have inherently higher professional organization participation, and therefore it would be more of a pressing issue. One alternative explanation could be that those SBAE teachers who volunteered for this study will inherently be more involved in NAAE since that was one of the email listservs that the call for participants was advertised on.

As our participants identified different successes and struggles within their SBAE experiences, it should be noted that some methodological implications arose from the analysis as well. Of note, in almost all of the interviews in this study, there was one point where the participant stated to the interviewer “you know how it is”. In a moment of reflexivity as a qualitative researcher, it’s

important to note that this could potentially lead to lost context for the data and subsequent analyses had we not taken in-moment and member-checking opportunities to prompt the participant for more detail. However, it begs the question if this allusion to a shared identity from participant can serve as a marker for the trustworthiness of the data.

Limitations

The limitations of this study are many. First, identity relating to gender and sexuality is understood by many to be complex, fluid, and impacted by social learning. So, while there are three explicit identities stated for the participants of this study, we cannot be guaranteed that those with similar identities share these same experiences.

Additionally, while there are a variety of identities represented within the participants of this study, it should be noted that not all identities that make up the LGBTQ+ community were present. In addition, all participants identified as white – indicating that the analysis from this sample cannot and should not be used to describe the experiences of nonwhite LGBTQ+ SBAE teachers.

Further factors to consider when interpreting these results include the size and location of the community the participants were raised and similar traits of the locations where they currently live and work. In order to preserve the anonymity of our participants, these details were not requested in the semi-structured interviews, or if they were, were removed from any analysis.

Recommendations

Relating to the population of interest, recommendations for researchers stemming from this study are simple: continue to document the experiences of LGBTQ+ teachers. While it is impossible to assess the frame of this population within the SBAE community, continued documentation and transferability of future studies will continue to improve our understanding of this population of teachers and will provide a stronger base of scholarship to inform future research and policy.

For teacher educators and state/national staff, it's important to learn about the experiences of LGBTQ+ teachers that you work with. This is important so you'll be prepared to have candid conversations with LGBTQ+ teacher candidates about the reality of teaching SBAE in your context. Particularly, SBAE state staff and those in supervisory roles have an ethical obligation to communicate honestly with teacher candidates about the risks of being out as an LGBTQ+ person in our profession, and where they might anticipate homophobic people and spaces.

Relating to the homophobic prejudice and exclusion that has been experienced by our participants at the local and state levels of SBAE, all members of the SBAE community (researchers, teacher educators, practitioners, state staff, supervisors, etc.) who identify as an ally to the LGBTQ+ community should seek to take an offensive approach in identifying sources and impacts of prejudice in the SBAE community. While resilience can be an important factor for the success of LGBTQ+ teachers, especially as it pertains to their mental and emotional well-being, it's important to remember that the end goal is *not* to build resilience, but to build a more equitable environment where resilience is not needed.

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Relationship Between Employee Morale and the Perceived Relationship With Staff Chairs of the Arkansas Cooperative Extension Service Employees

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Abstract

The purpose of this study was to describe the relationship between the morale of Arkansas Cooperative Extension county staff and the perceived relationship with their staff chair. Qualtrics was used to distribute the Leader- Member Exchange-7 (LMX-7) and the Staff Morale Questionnaire (SMQ) electronically to county Extension employees. Implications of the study suggest that leader-member relationships can affect employee morale. The higher the quality of relationship employees perceive with their staff chair, the higher their morale will be. County staff had moderate to high level of morale in each of the three constructs as measured by the SMQ. County-level staff also felt united in striving to achieve the goals and mission of their county office and Extension as a whole. The Arkansas Cooperative Extension Service can utilize the results from this research to identify individuals who have the capacity to build high- quality relationships with staff members, thereby promoting higher levels of morale within the organization. Administrators can use this study to identify current or future leaders within the organization by identifying those who can promote high-quality relationships with county-level staff. Results from this study may also be used to identify individuals needing training in developing high-quality relationships.

Introduction and Theoretical Framework

Employee morale is vital to maintaining a viable Extension workforce. Morale can affect how employees feel about their career, influence their productivity, affect Extension program success, and influence relationships between agents and their clientele. Extension administrators must demonstrate effective leadership skills to instill positive employee morale within the organization. Similarly, Extension employees must respect, trust, and have open communication with their administrators. If Extension employees have low morale, that may affect how they serve their clientele and in return, clientele may be unsatisfied with how Extension employees respond to their needs (Johnson & Bledsoe, 1974). Furthermore, “poor morale, recognized or not, contributes to increased personnel turnover, lowered effectiveness, and most importantly, an intensified struggle to stay fully staffed” (Giegold & Skelton, 1976, p. 6).

While certain factors such as personal life issues, work growth opportunities, supervisors, co-workers, and pay can lead to low morale (Scott, 1967), the relationship between employees and their administrators can also be attributed to low employee morale. Leadership factors that may influence employee morale include micro-managing employees, lack of clear or concise communication, and lack of leadership or a laissez-faire leadership approach (Amend, 1970; Carpenter, 1966; Giegold & Skelton, 1976; Gill, 2008; Loke, 2001; Ngambi, 2011; Rausch, 1971; Skaggs, 2008).

Determining how Extension administrators perceive their leadership relationship with their employees and vice versa can give insight into employee morale and perhaps how to correct it if needed. Rothfelder et al. (2013) reported that when employees felt they were considered valued members of an organization, customer satisfaction increased. Ngambi (2011) concluded that as the organizational climate changed for the better, so did employee morale.

Giegold and Skelton (1976), Johnson and Bledsoe (1974), and Ngambi (2011) all identified key characteristics that effective administrative leaders possessed to help to ensure high employee morale. Identified characteristics included vision, courage, integrity, humility, foresight, focus, cooperation, effective communication, trust, teamwork, motivation, recognition, constructive criticism, clear expectations, and shared organizational values and goals (Fernet et al., 2015; Gill, 2008; Hernandez, 2011; Ngambi, 2011; Rothfelder et al., 2013). Although research has shown that leadership style can affect morale both positively and negatively (Buch et al., 2016; Dhar & Mishra, 2001; Fernet et al., 2015; Gill, 2008; Hernandez, 2011; Jones, 2012; Loke, 2001; McKnight et al., 2001; Ngambi, 2011; Rooney et al., 2009; Rothfelder et al., 2013), no studies could be found that discussed the relationship between leadership style and morale in Extension.

Although there have been several studies on Extension agent morale, these studies were conducted more than 50 years ago when administrators demonstrated transactional leadership styles. By the end of the 1970s, Extension administrators were demonstrating more transformational leadership styles. Dansereau et al. (1973) looked at relationships among supervisors and subordinates to predict employee outcomes during the same period and found a positive effect of high-quality leader-member exchange relationships on follower outcomes.

For Extension to remain relevant, competitive, and sustainable, Extension must adopt practices that foster high-quality functioning employees (Fernet et al., 2015). Ngambi (2011) found a relationship existed between an administrator's leadership style and employee morale, finding that the leadership characteristics that most affected employee morale were communication, trust, and team building.

Graen et al.'s (1982) Leader-Member Exchange (LMX) Theory provided the theoretical framework for this study. Formally known as Vertical Dyad Linkage (VDL), this theory describes the dyadic relationship between a leader and each subordinate. "The key role of the leader is maintaining equitable contingencies between the performance of his members and the outcomes that he mediates for them and in communicating these contingencies clearly to his members" (Dansereau et al., 1973, p. 190). According to Burns & Otte (1999), "dyadic theory, when applied to leadership, describes leadership in terms of the pair relationship existing between people in leadership roles and each of their subordinates, emphasizing the influence of individual variables flowing both ways" (p. 228). The leadership theory describes, in broad terms, "that the leader and each member of a workgroup have a unique relationship" (Burns & Otte, 1999, p. 225).

Purpose and Objectives

The purpose of the study was to determine if there was a relationship between Arkansas Cooperative Extension county staff morale and the perceived relationship county staff had with their staff chair. Specific research objectives were to: (1) Assess the morale of Extension agents and support staff employed by the Arkansas Cooperative Extension Service, (2) Assess how Extension agents and support staff perceived their relationship with their staff chair, and (3) Determine the relationship between the morale of county Extension staff and the perceived relationship with their staff chair.

Methods and Procedures

The population for this descriptive-correlational study consisted of 294 Extension agents (without Staff Chair responsibilities), employees, and support staff who worked full-time with the Arkansas Cooperative Extension Service. Extension agents and support staff must have completed at least one year of experience in their respective positions who worked under those staff chairs and were full-time employees (FTE).

Two instruments were used to collect data for this study. The Leader-Member Exchange (LMX-7) (Graen et al., 1982), was used to measure the quality of the relationship between staff chairs and Extension employees.. The LMX-7 consists of seven statements to measure the quality of the leader-member relationship with each statement having a different response, but using the scale 1= lowest level, 3 = neutral/average, and 5 = highest level. “LMX measures respondent perceived leader-member exchange—things that cannot be measured directly” (Schriesheim & Cogliser, 2009, p. 725). The LMX-7 has been extensively used and is valid and reliable (Graen et al., 1982; Duluga, 1994; Graen & Uhl-Bien, 1995; Erdogan et al., 2002; Schriesheim & Cogliser, 2009) with a Cronbach’s alpha of 0.898 (Dhar, 2016).

Employee morale was evaluated using a modified version of the Staff Morale Questionnaire (SMQ), initially developed by Smith (1971). Responses to the items are scored numerically, where 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Smith (1971) defined morale as a “forward-looking and confident state of mind relevant to a shared and vital purpose” (p. 33). Construct validity of the SMQ was determined by subjecting the data to factor analysis (Smith, 1971; Williams & Lane, 1975). In its original form, the SMQ was used and found reliable among K-12 educators. The SMQ was modified to use Extension vernacular and split double-barreled questions. Before the modified version was used in this study, it was pilot tested for validity and reliability with a sample of 10 [University] Extension agents. The SMQ measures three constructs of morale. The leadership synergy construct subscale consisted of 15 items ($\alpha = .92$), the cohesive pride construct subscale consisted of 6 items ($\alpha = .86$), and the personal challenge construct subscale consisted of 7 items ($\alpha = .81$).

Data was collected through an online survey administered through Qualtrics. An email containing a cover letter providing detailed information about the purpose, confidentiality, and anonymity of the study was sent to the participants via email. A link to the survey was also included in the email. A two-week deadline was given, with a follow-up email sent at days 7, 10, and 14 days respectively after the initial email request to encourage Arkansas Extension Service

Employees' involvement. There was an 83% response rate to the survey.

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize data. Pearson's r was used to describe the relationship between variables perceived leader-member relationship and employee morale. ANOVA and t -tests were used to analyze relationships between demographic characteristics of respondents and employee morale and the perceived leadership relationships. The Chi-square test for Independence was used to determine if there was a relationship between the categories of employee morale and perceived leadership relationship. Kendall's Tau b was used to describe the strength and magnitude of these relationships.

Results and Findings

Demographics of Respondents

Of the 143 valid responses, 80.2% ($f = 115$) were female, 12.6% ($f = 18$) were male, and 1.4% ($f = 2$) preferred not to identify their gender. Eight (5.6%) of the respondents did not respond to the gender question.

Respondents also indicated their ethnicity and race. More than 91% ($f = 131$) identified themselves as non-Hispanic and 2.5% ($f = 4$) indicated they were Hispanic. Eight respondents (5.6%) did not identify their ethnicity. Regarding their race, 89.5% ($f = 128$) indicated they were White, 4.2% ($f = 6$) were African American/Black, and 5.6% ($f = 8$) were American Indian/Alaskan Native. One respondent (0.7%) did not indicate their race.

Respondents were asked to indicate their current position in the county Extension office. Of the 143 valid responses, 20.3% ($f = 29$) were the County Extension Agent - Agriculture, 30.8% ($f = 44$) were the County Extension Agent - Family & Consumer Science, 12.6% ($f = 18$) were the County Extension Agent - 4-H, and 36.4% ($f = 52$) were Support Staff.

County staff were also asked to indicate the number of years they had served in their current role. Of the 143 valid responses, 49.1% ($f = 71$) had been in their current role 1-5 years, 21.0% ($f = 30$) had been in their current role 6-10 years, 9.1% ($f = 13$) had been in their current role 11-15 years, 11.2% ($f = 16$) had been in their current role 16-20 years, 2.8% ($f = 4$) had been in their current role 21-25 years, and 6.3% ($f = 9$) had been in their current role 26+ years.

Morale of County Extension Agents and Support Staff

Morale of county Extension agents and support staff was determined through the administration of the SMQ. The SMQ consists of three constructs: Leadership Synergy, Cohesive Pride, and Personal Challenge. Fifteen statements on the SMQ measured Leadership Synergy, which describes how followers perceive that their immediate supervisor communicates, instills trust, and builds a team atmosphere so that workers feel confident in exploring new ideas and feel energized in the workplace. Of the 136 valid responses for the Leadership Synergy Construct, out of a possible total score of 60, the mean score for Leadership Synergy was 48.9 ($SD = 6.00$).

Six statements in the SMQ were related to Cohesive Pride. Cohesive Pride relates to how individuals perceive their work relationship with their co-workers and leader, reflecting a sense of cooperativeness. Of the 140 valid responses regarding the Cohesive Pride Construct with a total possible point of 24, the mean score was 18.92 ($SD = 2.36$).

There were seven statements on the SMQ related to Personal Challenge. Personal Challenge relates to how individuals perceived their work to be challenging, representing the incentive derived from satisfaction in the county office. Of the 135 valid responses regarding Personal Challenge Construct, out of a possible score of 28, the mean score was 20.73 ($SD = 2.70$).

Extension Agent/Support Staff Relationship with Staff Chair

The LMX-7 was used to determine the perceived dyadic relationship between Extension agents/support staff and their staff chair. Score attained from the LMX-7 indicated the quality of the leader-member relationship. Scoring interpretation of the LMX was as follows: very high = 30-35, high = 25-29, moderate = 20-24, low = 15-19, very low = 7-14.

Table 1 shows the frequency indicating the perceived relationship of followers (Extension agents and support staff) with their leader (staff chair). Of the 141 valid follower respondents, 43.1 % ($f = 61$) indicated they had a very-high quality relationship with their staff chair, 32.0% ($f = 45$) indicated they had a high-quality relationship, 14.2% ($f = 20$) indicated a moderate quality relationship, 5.7% ($f = 8$) indicated a low-quality relationship, and 2.8% ($f = 4$) indicated a very low-quality relationship with their staff chair. The highest possible score for the LMX is 35, with the mean in this study for followers (Extension agents and support staff) being 27.37 ($SD = 5.7$).

Table 1

Perceived Relationship of Extension Agents and Support Staff to Their Staff Chair According to LMX-7 (n = 141)

LMX Score	<i>f</i>	%
Very High (30-35)	61	43.1
High (25-29)	45	32.0
Moderate (20-24)	20	14.2
Low (15-19)	8	5.7
Very Low (7-14)	7	5.0

$M = 27.37, SD = 5.7$

Extension Agent/Support Staff LMX Scores by Role and Years in Role

County staff LMX scores were separated by the role county staff members held with the Arkansas Cooperative Extension Service. Mean score were as follows: County Extension Agent - Agriculture = 26.71 (*SD* = 4.66), County Extension Agent - Family Consumer Science = 25.91 (*SD* = 6.23), County Extension Agent - 4H = 28.72 (*SD* = 5.38), and Support Staff = 28.51 (*SD* = 5.88).

County staff LMX scores were separated by the number of years of service with the Arkansas Cooperative Extension Service. Mean scores on the LMX were as follows: 1- 5 years = 26.39 (*SD* = 6.18), 6-10 years = 28.17 (*SD* = 7.73), 11-15 years = 27.92 (*SD* = 2.39), 16-20 years = 28.00 (*SD* = 6.72), 21-25 years = 31.75 (*SD* = .50), and 26+ years = 28.67 (*SD* = 3.57).

Differences in LMX Score by Role

A one-way ANOVA was performed to determine if there was a significant difference between Arkansas County Extension Staff roles (followers) and their LMX score (Table 2). The analysis revealed there was no statistically significant difference in LMX scores between the four roles of County Extension Staff ($F(3, 137) = 2.09, p = .104, \eta^2 = .044$). The effect size for LMX score and role of county staff was small (Cohen, 1988).

Table 2

Differences in LMX Score by Role of County Staff in the Arkansas Cooperative Extension Service

	SS	df	Mean Square	<i>F</i>	<i>p</i>	η^2
Between Group	205.12	3	68.32	2.09	.104	.044
Within Group	4473.71	137	32.66			
Total	4678.82	140				

Extension agent and support staff LMX scores were separated by the specific role held within the Arkansas Cooperative Extension Service. Mean scores and standard deviations were as follows: County Extension Agent - Agriculture ($M = 26.71, SD = 4.66$), County Extension Agent - Family Consumer Science ($M = 25.91, SD = 6.23$), County Extension Agent - 4H ($M = 28.72, SD = 5.38$), Support Staff ($M = 28.51, SD = 5.88$).

Extension agent and support staff LMX scores were also separated by the number of years of service with the Arkansas Cooperative Extension Service. Mean scores and standard deviations were as follows: 1 - 5 years ($M = 26.39, SD = 6.18$), 6 - 10 years ($M = 28.17, SD = 7.73$), 11 - 15 years ($M = 27.92, SD = 2.39$), 16 - 20 years ($M = 28.00, SD = 6.72$), 21 - 25 years ($M = 31.75, SD = .50$), 26+ years ($M = 28.67, SD = 3.57$).

Differences in LMX Score by Role

A one-way ANOVA was performed to determine if there was a significant difference between the role of Extension agents and support staff (followers) and their LMX score (Table 2). There was no statistically significant difference in LMX scores between the four roles of Extension agents and support staff ($F(3, 137) = 2.09, p = .104, \eta^2 = .044$). The effect size for the difference between LMX score and role of county Extension staff was small (Cohen, 1988).

Table 2

Difference in LMX Scores by Current Role in the Arkansas Cooperative Extension Service

	SS	df	Mean Square	F	p	η^2
Between Group	205.12	3	68.32	2.09	.104	.044
Within Group	4473.71	137	32.66			
Total	4678.82	140				

Difference in LMX Scores by Years of Service

A one-way ANOVA was performed to determine if there was a significant difference between the number of years Extension employees had worked in their current role and their LMX score. There was no statistically significant difference in LMX scores between the six groups ($F(5, 135) = 1.31, p = 0.35, \eta^2 = .040$) as reported in Table 3. The effect size for the difference between LMX scores and the number of years of service in their current role was small (Cohen, 1988).

Differences in LMX Score by Gender of County Staff

Table 4 shows the means and standard deviations of LMX scores between female and male followers (Extension agents and support staff) in the Arkansas Cooperative Extension Service. An independent-samples t-test was used to determine if there was a significant difference between gender and LMX score. There was no significant difference in LMX scores ($t(131) = -.30, p = .57$). The effect size was very small ($d = 0.075$) (Cohen, 1988).

Table 3

Difference in LMX Scores by Number of Years in Current Role of County Staff in the Arkansas Cooperative Extension Service

	SS	df	Mean Square	F	p	η^2
Between Group	188.06	6	37.61	1.31	0.35	0.040
Within Group	4490.76	135	33.27			
Total	4678.82	140				

Table 4

Independent Samples t-test on LMX Scores and Gender of Extension Agents and Support Staff

	Gender	n	M	SD	t	df	p	Cohen's d
LMX Score	Female	115	27.39	6.01	-.30	131	.57	0.075
	Male	18	27.83	5.00				

Relationship Between the Morale of County Staff and the Perceived Relationship with Their Staff Chair

Correlation Between Follower LMX Scores and SMQ Construct Scores

Pearson-product moment correlation coefficients were calculated to determine the relationship between Extension agent and support staff LMX scores and the three construct scores on the SMQ. There was a positive, moderate relationship between LMX Follower scores and the scores on the Leadership Synergy construct of the SMQ ($r(136) = .65, p < .001$). There was a positive, moderate relationship between LMX Follower scores and the scores on the Cohesive Pride construct of the SMQ ($r(140) = .51, p < .001$). There was a positive, moderate relationship between LMX Follower scores and the scores on the Personal Challenge construct of the SMQ ($r(135) = .51, p < .001$).

Relationship Between LMX and Morale- Leadership Synergy

A chi-square test of independence was performed to examine the relationship between the Leadership Synergy construct on the SMQ and the perceived relationship of Extension agents and support staff with their staff chair as measured by the LMX. There was a significant relationship between the Leadership Synergy construct and LMX scores ($\chi^2(8, n = 136) = 45.18, p < .001$). There was a moderate relationship between leadership synergy and the Extension agent and support staffs' perceived relationship with their staff chair ($\tau_b = .376$) (Table 5).

Table 5

Relationship Between Leadership Synergy and County Staffs' Perceived Relationship with Staff Chair

<i>Leadership Synergy x Perceived Relationship with Staff Chair</i>	Very Low	Low	Moderate	High	Very High
Disagree	2	4	1	1	1
Agree	5	4	17	38	43
Strongly Agree	0	0	0	4	16
Total	7	8	18	43	60

$\chi^2=45.18, \tau_b = .376, p < .001$

Relationship Between LMX and Morale-Cohesive Pride

A chi-square test of independence was performed to examine the relationship between the Cohesive Pride construct and County Staffs' perceived relationship with Staff Chair as measured by the LMX. There was a significant relationship between the Cohesive Pride construct and LMX scores ($\chi^2 (8, N = 140) = 43.66, p < .001$). There was a low relationship between cohesive pride and the perceived relationship with the staff chair ($\tau_b = .232$) (Table 6).

Table 6

Relationship Between Cohesive Pride and County Staffs' Perceived Relationship with Staff Chair

<i>Cohesive Pride x Perceived Relationship with Staff Chair</i>	Very Low	Low	Moderate	High	Very High
Disagree	2	2	0	0	0
Agree	5	5	19	28	42
Strongly Agree	0	1	1	16	19
Total	7	8	20	44	61

$\chi^2 = 43.66, \tau_b = .232, p = .002$

Relationship Between LMX Morale-Personal Challenge

A chi-square test of independence was performed to examine the relationship between the Personal Challenge construct and the perceived relationship with the staff chair as measured by the LMX. There was not a significant relationship between the Personal Challenge construct and the LMX score ($\chi^2 (8, N = 135) = 13.59, p = .09$) (Table 7). There was a low relationship between personal challenge and the perceived relationship with the staff chair ($\tau_b = .199$).

Table 7

Relationship Between Personal Challenge and County Staffs' Perceived Relationship with Staff Chair

<i>Personal Challenge x Perceived Relationship with Staff Chair</i>	Very Low	Low	Moderate	High	Very High
Disagree	3	1	1	6	3
Agree	4	7	16	34	50
Strongly Agree	0	0	1	2	7
Total	7	8	18	42	60

$\chi^2 = 13.59, \tau_b = .199, p = 0.01$

Conclusions/Recommendations/Implications

County staff with the Arkansas Cooperative Extension Service had moderate to high levels of morale in each of the three constructs as measured by the SMQ. Cohesive Pride was the highest-rated construct among county-level staff, suggesting that those staff have a sense of belonging and being part of their team. County staff also felt united in striving to achieve the goals and mission of their office and Extension as a whole. Leadership Synergy was rated in the middle of the three constructs, suggesting that county staff believe leadership within the office were providing the guidance and feedback they need to do their job. Furthermore, there is

adequate group energy generated and released among county staff and their staff chair. Personal Challenge rated the lowest of the three constructs measuring morale, especially with statements related to challenges and burdens of the job. This could be interpreted that Extension staff may not feel incentivized or be personally satisfied with either the situation in their county office or with Extension or they may feel that too much pressure is put on them to perform.

The LMX revealed that the majority of county staff perceived their relationship quality with the county staff chair to be high to very high. There were no statistical differences found among the four roles of the county staff, years of service, or gender. Higher scores revealed stronger, higher-quality leader-member exchanges, whereas lower scores revealed exchanges of lesser quality.

As there have been no studies with Extension entities in other states using the LMX, there is no research to compare these outcomes. However, Linden and Graen (1980) found members reporting high-quality relationships with their leaders assumed more responsibilities and contributed more to their work units, and they were regarded as high performers. Garg and Dhar (2014) shared that high-quality LMX led to higher levels of organizational commitment. Implications for this study were that County Staff that indicated higher-quality relationships with their Staff Chair also had higher morale.

Leader-member exchange theory suggests that leadership is a personalized exchange in which leaders act differently toward each follower. This further implies that followers develop different groups based on the quality of their interpersonal relationships in-group (higher-quality relationship) and out-group (lower-quality relationship). Leader exchanges with insiders are based on support and trust. Leader exchanges with outsiders are mechanical and authoritative. The theory holds that in-group members perform better and are more contented than out-group members (Buford et al., 1995).

This study concluded that the perceived leader-member relationship for county staff members was positive and significantly influenced morale in all three constructs of the SMQ. These findings were consistent with current research (Anand et al., 2018; Kuuvas & Buch, 2018; Martin et al., 2016; Newman, et al., 2017; Matta et al., 2015) that presented the positive effect of high-quality leader-member exchange relationships on follower outcomes of trust in the leader, job satisfaction, work performance, work engagement, and organizational citizenship behavior; and their negative effect on role overload and turnover intention and the negative effect of poor quality LMX relationships on organizational commitment and job satisfaction. Johnson and Bledsoe (1974) came to the same conclusion that leader behavior and Extension employee morale was “significantly and highly related” (p. 16). The perceived relationship quality between leaders and followers is essential for employee morale.

The results of this study suggest that leader-member relationships can affect employee morale in all three constructs measured. The higher quality relationships employees perceive they have with their staff chair, the higher their morale will be. This study agrees with those conducted by researchers (Buch et al. 2016; Dhar & Mishra, 2001; Fernet et al., 2015; Gerstner & Day, 1997; Gill, 2008; Hernandez, 2011; Jones, 2012; Loke, 2001; McKnight et al., 2001; Ngambi, 2011; Rooney et al., 2009; Rothfelder et al., 2013; Skaggs, 2008) that surmised that

leaders and leadership style can affect morale, employee turnover, and job satisfaction.

Extension administrators can use the results from this study to identify individuals that have the capacity to build high-quality relationships with staff members, thereby promoting higher morale within their organization. Furthermore, there is potential for administrators to identify leaders or future leaders within their organization by identifying those who have high-quality relationships. It is also recommended that those who cannot progress in relationship development with staff members be assisted through training to achieve the desired relationship quality with staff members. Extension administrators can use this study to identify what aspects of the workplace determine employee morale levels, and as this study showed, it was different depending on their role.

Whereas this study evaluated the morale of Staff Chairs, their morale was not compared to the morale of their subordinates. This opens the doors for future research to be conducted to see if there is a relationship between leader morale and subordinate morale. Although the research of (Burford et al., 1995; Johnson & Bledsoe, 1974) has shown that low morale can affect productivity, it is recommended that a follow-up study could determine if Leader-Member Exchange affects the productivity of employees and/or clientele response.

There is a potential for studies to explore employees who stayed versus those who left a work environment, the Leader-Member Exchange, and the morale of those who stayed versus those who left. Another angle to explore, then, may be to compare the career stages of employees who leave Extension and what is different at those career stages for employees who stay. Because each state's Cooperative Extension Service is set up differently than Arkansas, it is recommended that future research could be conducted to determine if systems differ in leader- member exchange and morale.

This study did not evaluate if there was a difference in age and LMX or morale. There is potential for studies to explore generational differences in LMX and morale and to evaluate if there is a difference in how the generations form relationships or if there are different factors that affect morale between generations.

This study did not evaluate if there was a difference in race and LMX or morale. From a race/ethnicity perspective, this study lacked diversity of participants. A broader demographic of participants alone may be an area for future research. Within diversity, more research could look at the socio-economic area in which Extension staff is employed on the effects of LMX and morale.

In this study, both leaders (Staff Chairs) and members (County Staff) rated the Cohesive Pride construct highest from the SMQ. The Cohesive Pride construct appeared to fit in very well with the LMX theory in terms that it defined work relationships with co-workers and leaders, reflecting a sense of cooperativeness. The LMX theory could be enhanced by including the six statements of the Cohesive Pride Construct in future research.

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Educational Law: How do Superintendents Perceive the Relevance of Educational Law Issues to Agricultural Educators

Abstract

Throughout the past few decades, the education profession has become more legalistic and litigious. The danger of litigation is an imminent threat for agricultural educators due to the potential financial and professional ramifications. In many cases, agricultural educators may be at higher risk for a lawsuit than teachers of other subjects due to the increased liability of the agricultural mechanics shop, greenhouse, on-campus livestock facilities, etc. In most public-school districts, the school superintendent is the head administrator and often manages all school-related legal action. Understanding the perceptions of school district superintendents on the importance and relevance of various educational law issues to agricultural educators can provide insight into which legal issues are the most critical for agricultural educators to manage. The study utilized a Principal Component Analysis (PCA) to extract components utilizing correlations between individual factors. This analysis reduced Hainline et al.'s (2019) original 32 educational law issues to four principal components: 1) General Educational Law Issues, 2) Special Education/Student Interaction Issues, 3) Student Safety/Teacher Contract Rights, and 4) Student Behavior/Curricular Modification Issues. Recommendations for future research include investigating the level of understanding that agricultural educators have regarding educational law and to develop educational experiences related to general legal issues.

This manuscript is based on data presented at the Southern Region Conference of the American Association for Agricultural Education (Norris & Norris-Parrish, 2023).

Introduction and Review of Literature

Agricultural educators are tasked with the daunting undertaking of training youth on a myriad of agricultural topics. The responsibility of educating students for their future careers, while also kindling passions for the agricultural industry has traditionally been held in high regard. While this profession can be fulfilling, the constant immanence of liability and legal repercussions can often overshadow the rewarding nature of the vocation. Additionally, educators are asked to follow strict administrative, statutory, judicial, and constitutional laws that directly impact the operation of schools. These legal sources govern educational law interests and guidelines related to student rights, employment contracts, student discipline, and statutory immunity (Walsh et al., 2014).

Over the past few decades, education has become increasingly more litigious for classroom teachers (Hainline et al., 2019; Redfield, 2003; Wagner, 2008; Walsh et al., 2014; Zirkel, 2006). In 1970, 300 school districts were named defendants in lawsuits. In 2001, the number of school-district-related lawsuits increased nearly five times to 1,800 suits (Redfield 2003). As educational law has evolved, its impact on the local school system has continued to grow. To avoid legal issues, it is critical that practicing educators have a firm understanding of educational law (Hainline et al., 2021; Schimmel et al., 2011; Wagner, 2008).

Developing insights toward educational law and its effect on teachers is a major point of interest for educators (Bon et al., 2008; Hainline et al., 2019; Littleton, 2008). While many educators are interested in learning more about educational law, many studies show that classroom teachers have a lack of knowledge on the subject (Andreasen et al., 2007; Cotton, 2000; Fischer et al., 2007). This lack of knowledge also can transcend into the educator's self-efficacy and confidence levels, which can also lead to lower career engagement due to fear of conflict with legal implications (Hainline et al., 2019).

In many cases, teacher preparation programs do not adequately educate pre-service teachers on educational law (Gajda, 2008). This lack of understanding could be detrimental to the career of an educator due to the financial and professional ramifications. According to Schimmel et al. (2011), "Educators ignore the law at their peril since the U.S. Supreme Court has ruled that teachers and administrators may be held personally liable... for violating students clearly established constitutional rights" (p. xii). This liability in the classroom can be particularly fastidious for agricultural educators due to the experiential nature of agricultural education. Experiences provided in the agricultural mechanics shop, greenhouse, on-campus livestock facilities, and numerous other locations create another layer of potential liabilities for the agricultural educator (Chumbley et al., 2018; Dyer & Andreasen, 1999; Saucier et al., 2014). Furthermore, this perpetuates the need for teachers to have a working knowledge of current laws and must be cognizant of future changes to legislation and education laws (Schimmel et al., 2011).

Similarly, not only can building a strong foundation of legal knowledge help educators position themselves more confidently in their careers, but it can also provide educational value in their classrooms. The agricultural industry is overflowing with legal implications and policy restraints (Hamilton, 1990). Gaining a deeper understanding of general legal issues influencing their role as educators could also help improve their ability to discuss prominent legal issues related to agricultural policy, which can advance the depth of content they can include in their secondary agricultural education courses.

In most educational litigation, the process often flows through the school district superintendent and other district leaders and administrators. Furthermore, educational administrators understand educational law better than classroom teachers (Gajda, 2008). As a result, understanding the perceptions of local district superintendents on impactful and relevant legal issues facing agricultural educators can help shed light on legal issues that are the most important to agricultural educators, further advancing their self-efficacy and confidence in their positions.

Purpose and Objectives

The purpose of this study was to assess the perceptions of superintendents in Kentucky, South Carolina, Arkansas, Louisiana, Florida, Virginia, Georgia, and Mississippi on the importance/relevance of various educational law issues to agricultural educators. The following research objectives were assessed:

1. Describe the demographic characteristics of superintendents in Kentucky, South Carolina, Arkansas, Louisiana, Florida, Virginia, Georgia, and Mississippi using central tendencies.

2. Assess the principal component analytic properties of the assessed educational law issues and determine any correlational relationships between each educational law issue in the components.

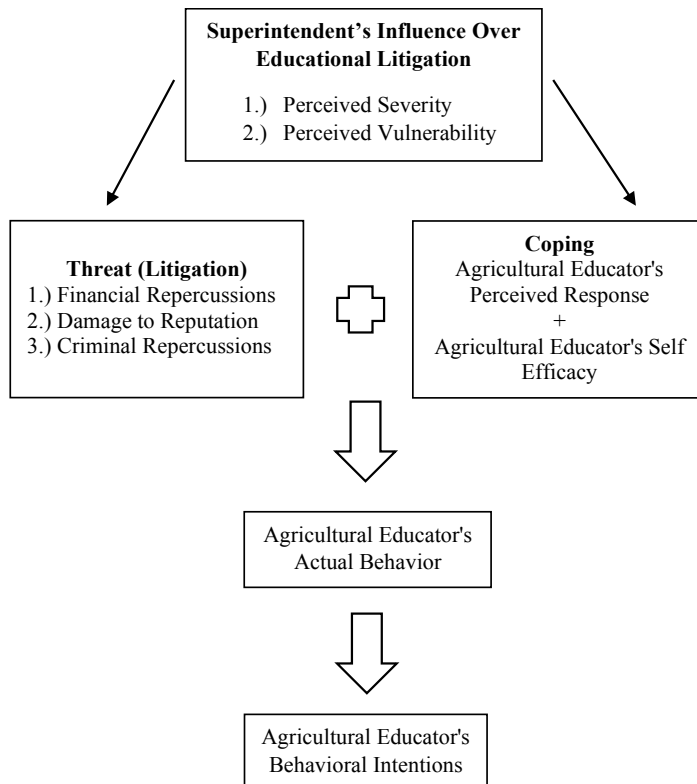
Theoretical Framework

The protection motivation theory (Rogers, 1983) served as the theoretical guide for this study (see Figure 1). The protection motivation theory aims to predict an individual’s reaction to a threat and their process of managing the risk associated with the threat (Rogers, 1983). According to Rogers (1983), “[t]he emotion of fear has been of interest because of its role in mediating attitude and behavior change.” (p. 4) In this study, agricultural educators perceive educational litigation as a threat due to the potential financial and professional ramifications, which could include damage to their reputation or even criminal repercussions (Hainline et al., 2019).

Coping “provides a psychological construct that includes behavioral and cognitive events” to occur (Tunks & Bellissimo, 1988, p. 171). As the agricultural educator gathers their perceived response to the threat of litigation and combine it with their perceived level of self-efficacy, coping can occur. When the threat of litigation compounds with their coping mechanics, the agricultural educator’s actual behavior can be determined. Especially in stressful litigious situations, educators’ behavior may also be influenced by their perceived risk related to the threats from the scenario.

Figure 1

Protection Motivation Theory, adapted from Rogers (1983)



While agricultural educators perceive educational litigation and educational law issues as an imminent threat, research shows that their overall understanding of educational law is lacking (Andreasen et al., 2007; Cotton, 2000; Fischer et al., 2007). Therefore, in most cases, the superintendent has influence over the litigation involving the school district and its employees. As a result, the superintendent's influence can impact the agricultural educator's perception of the severity of the repercussions of litigation and their vulnerability to litigation. These perceptions directly influence the litigious threat and the agricultural educator's coping of this threat. Ultimately, these factors will influence the agricultural educator's behavior.

As the chief administrator of the school district, understanding the perceptions of school district superintendents will assist in determining the most important and relevant educational law issues to agricultural educators. This will further the knowledge of exactly what educational law issues are the most threatening and relevant to agricultural educators in the classroom.

Methods

We used a descriptive correlational research design for this study. The research instrument consisted of two sections—section one outlined demographic data and section two measured the perceptions of superintendents on the importance and relevance of various educational law issues to agricultural educators.

Instrumentation

In the first section, the demographic questionnaire consisted of questions gauging the participants' gender, race, educational level, size of school district, school system type, inclusion of agricultural education program, and personal background in career and technical education (CTE). Describing these foundational demographic descriptors provided helpful context to the perceptions of prominent legal issues.

The second section measured superintendents' perceptions of the importance and relevance of educational law issues related to agricultural educators. Using a 32-item instrument, we used a five-point Likert-type scale rating (1 = *Not Important at All*; 2 = *Somewhat Important*; 3 = *Moderately Important*; 4 = *Very Important*; 5 = *Extremely Important*) to gauge these perceptions. We modified the items in this study's instrument (see Table 1) using Hainline et al.'s (2019) instrument of law issues influencing school district attorneys and district superintendents.

In Hainline et al.'s (2019) three-phase, Delphi study, participants responded to two qualitative questions gauging participant responses to: 1) which general legal issues were the most prominent for teachers, and 2) which legal issues related to agricultural education were the most prominent for teachers. From the open-ended questions, Hainline et al. (2019) identified 52 individual educational law issues where they gauged the threshold for consensus in statements and retained the individual issues. Due to comprehensive Delphi approach in Hainline et al.'s (2019) study, we adapted that instrumentation to further gauge levels of concern through school superintendents.

Table 1

Educational Law Concerns Related to Agricultural Educators

Accommodations for students with disabilities.
Communication with parents.
Communication with supervisors and administrators.
Complying with special education mandates (IEPs).
Dealing with booster club/support organizations.
Duty to report suspected child abuse and neglect.
Educator code of ethics.
Financial literacy regarding the proper handling of money.
Harassment issues based on sex, race, color, religion, etc.
Inappropriate communication via texts.
Inappropriate contact between educators and students.
Liabilities associated with the handling of livestock.
Liability of dealing with hostile students.
Mishandling State and Federal CTE Funds
Operating and maintaining a motorized vehicle.
Properly dealing with students' behavioral issues.
Sexual harassment.
Student confidentiality (FERPA).
Student discipline in school.
Student discipline on extracurricular activities.
Student safety at school farm.
Student safety in the agricultural mechanics shop.
Student supervision at extracurricular events.
Student supervision at livestock shows.
Student transportation using other methods.
Student transportation using personal vehicle.
Supervising students on an overnight stay.
Supplemental duties as an extracurricular sponsor.
Teacher contract rights.
Title IX complaints.
Understanding school district/board policy.
Understanding teacher employment contracts.

Note. The following statements were modified from Hainline et al.'s (2019) study and were sorted on a five-point Likert-type scale rating (1 = *Not Important at All*; 2 = *Somewhat Important*; 3 = *Moderately Important*; 4 = *Very Important*; 5 = *Extremely Important*).

Validity and Reliability

We measured the reliability of the survey instrument post hoc and deemed the instrument suitable for the purpose of the study. Reliability coefficients (Cronbach's alphas) for scales measuring the importance and relevance of general educational law issues was .936 and the reliability coefficient for agricultural education specific educational law issues was .951. These figures indicate that the scales are extremely reliable (Gliem & Gliem, 2003). The instrument developed by Hainline et al. (2019) was also assessed using a Cronbach's alpha and was deemed appropriate.

Data Collection

We compiled a list of superintendents using resources from each state's department of education websites, school system websites, and, if necessary, a phone call to the local district to collect the superintendents' emails. The list included the name of the superintendent and their email address. Due to mistakes in the resources utilized to build the frame, frame error is a possible limitation of the study. This list contained viable emails for 169 superintendents in Kentucky, 75 in South Carolina, 260 in Arkansas, 54 in Louisiana, 62 in Florida, 128 in Virginia, 191 in Georgia and 135 in Mississippi ($N = 1,074$). These eight states were chosen due to their close geographic proximity to each other.

We used a census approach to collect data and alleviate sampling bias. According to Hill (1998), a response rate of 10% is necessary for quality descriptive research. In this study, a response rate of 14.15% ($n = 152$) overall was achieved. We retained partial responses that completed the instrument, but not all of the demographics. Overall, there were ($n = 137$) full responses and ($n = 15$) partial responses.

Data Analysis

The analysis of all data occurred using SPSS Version 28.0. We used frequencies, percentages, means, and standard deviations to analyze research objective one and a Principal Component Analysis (PCA) for research objective two. While there are a multitude of recommendations on an appropriate sample size for a quality PCA, the ($n = 152$) was deemed appropriate by the researchers. One recommendation made by Gorsuch (1983) suggested a minimum of 100 samples is necessary, and Hutcheson and Sofroniou (1999) suggested a sample size of 150 or more is necessary for highly correlated data. Finally, a 2:1 ratio of observations to total number of factors was suggested by Kline (1979). While some researchers suggested higher samples sizes, much of the existing literature suggests that the sample size of ($n = 152$) is appropriate for the PCA.

To assess non-response bias and early/late response bias, a Multivariate Analysis of Variance (MANOVA) was used to compare differences (Linder et al., 2001). Overall, we sent six emails to each superintendent. For the purposes of determining nonresponse bias, participants who responded to the first three emails were considered early respondents ($n = 85$), and participants who responded to the last three emails were considered late respondents ($n = 67$). After analyzing for non-response bias and early/late response bias, no statistical differences were found. The analysis of all data occurred using SPSS Version 28.0. We used frequencies,

percentages, means, and standard deviations to analyze research objective one and a Principal Component Analysis (PCA) for research objective two.

Results

Research Objective One

The first research objective aimed to describe the demographic characteristics of participating superintendents. The full demographic information of the participants is listed in Table 2. The average years of classroom teaching experience was 9.3 ($SD = 5.4$) years and the average total years of experience in education was 28.6 years ($SD = 7.7$). Among other notable demographics, 88.1% of superintendents led a district with 9,000 or less students ($f = 103$), 86.3% offered agricultural education in their district ($f = 101$), 67.5% of participating superintendents were female ($f = 79$), and 87.2% were white ($f = 102$).

Table 2

Personal Demographics of Superintendents

Demographic	Descriptor	<i>f</i>	%
Gender	Female	95	68.3
	Male	44	31.7
Race	White	121	87.1
	African American	15	10.8
	Other	3	2.2
Highest Degree Earned	Bachelor's Degree	1	0.7
	Master's Degree	21	15.3
	Specialist	44	32.1
School District Size	Doctoral	71	51.8
	0–3,000 Students	85	61.2
	3,000–9,000 Students	34	24.4
	9,000–25,000 Students	12	8.7
School System Type	25,000+ Students	8	5.7
	City School System	34	24.5
	County School System	89	64.0
	Charter	1	0.7
Agricultural Education	Other	15	10.8
	Offered	120	85.7
Educational Background in CTE	Not Offered	20	14.3
	Yes	26	18.7
	No	113	81.3

Note. Retained partial responses causes the *n* to vary on some demographic categories.

Research Objective Two

The extraction method used in research objective two was Principal Component Analysis (PCA). The data were rotated using promax rotation with Kaiser normalization for the 32 originally assessed educational law issues (Kaiser, 1958). According to Tabachnick and Fidell (2001), “PCA is the solution of choice for the researcher who is primarily interested in reducing a large number of variables down to a smaller number of components” (p. 612).

To reduce error, a sample size of 100 or more subjects is suggested for PCA (Hair et al., 1998). The sample size of this study was 152 subjects which satisfies this requirement. Furthermore, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was .911 which meets the standard of a KMO value of .6 or higher for a quality factor analysis (Shrestha, 2021). Additionally, the communalities of each individual factor ranged from .50 - .84. This meets the standard threshold of a communality score of .40 or higher (Osbourne et al., 2008). The main methods to screen the original 32 variables include eigenvalues greater than or equal to one and a scree plot to evaluate slope changes in eigenvalues (see Figure 2 and Table 3; Tabachnick & Fidell, 2001).

Figure 2

Scree Plot for Eigenvalues within the Principal Component Analysis (PCA)

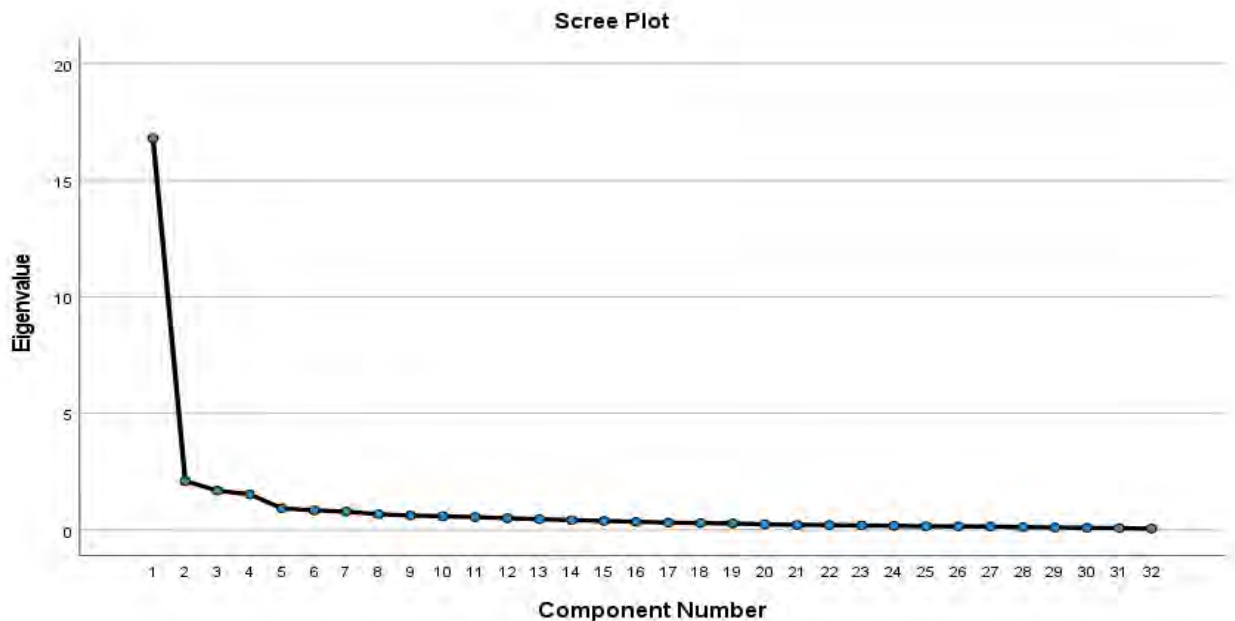


Table 3*Principal Component Analysis Factor Loadings*

	Components				Communalities
	1	2	3	4	
Accommodations for students with disabilities.	.60	.40	-.01	.44	.71
Properly dealing with students' behavioral issues.	.70	.26	.05	.53	.84
Inappropriate communication via texts.	.74	.18	.12	.00	.59
Inappropriate contact between educators and students.	.74	.25	.05	-.30	.70
Student discipline in school.	.68	.13	.23	.28	.61
Complying with special education mandates (IEPs).	.64	.51	-.01	.29	.75
Understanding teacher employment contracts.	.72	-.22	.33	.23	.74
Teacher contract rights.	.66	-.26	.50	.22	.81
Educator code of ethics.	.68	.24	.31	-.21	.66
Sexual harassment.	.73	.22	.29	-.34	.79
Student confidentiality (FERPA).	.73	.39	.19	-.16	.75
Duty to report suspected child abuse and neglect.	.68	.45	.04	-.27	.75
Harassment issues based on sex, race, color, religion, etc.	.81	.29	.02	-.24	.81
Title IX complaints.	.75	-.11	.18	-.14	.63
Understanding school district/board policy.	.65	-.20	.19	.04	.50
Liability of dealing with hostile students.	.83	-.14	.21	-.05	.76
Supervising students on an overnight stay.	.63	-.08	-.47	-.10	.63
Communication with parents.	.73	.10	-.22	.20	.64
Financial literacy regarding the proper handling of money.	.73	-.10	-.29	.23	.68
Mishandling State and Federal CTE Funds	.82	-.10	-.16	-.22	.76
Student safety in the agricultural mechanics shop.	.61	.13	-.40	.11	.58
Student supervision at extracurricular events.	.77	.15	-.33	.06	.73
Student transportation using personal vehicle.	.80	-.14	-.14	-.26	.76
Student transportation using other methods.	.76	-.23	-.14	-.19	.69
Communication with supervisors and administrators.	.79	-.16	-.05	-.05	.65
Liabilities associated with the handling of livestock.	.79	-.21	-.10	-.11	.69
Student discipline on extracurricular activities.	.79	-.29	-.15	.01	.73
Student safety at school farm.	.74	.01	-.40	.05	.65
Student supervision at livestock shows.	.74	-.13	-.18	.02	.60
Dealing with booster club/support organizations.	.66	-.37	.04	.16	.60
Operating and maintaining a motorized vehicle.	.72	-.38	.11	-.07	.68
Supplemental duties as an extracurricular sponsor.	.69	-.39	.15	.16	.68

Note. Extraction method was Principal Component Analysis (PCA) with promax rotation.

In addition, factor loadings of $\pm .40$ were used to further screen variables in each component. The factor loadings for each component are listed in Table 2 while the eigenvalues, the percentage of variance explained by each component, and the cumulative percentage of the variance explained is displayed in Table 4. The components retained in the PCA were named 1) General Educational Law Issues, 2) Special Education/Student Interaction Issues, 3) Student Safety/Teacher Contract Rights, and 4) Student Behavior/Curricular Modification Issues.

Table 4

Eigenvalues and Variance for Four Retained Components

Components	Eigenvalues	% of Variance	Cumulative %
#1- General Educational Law Issues	16.81	52.52	52.52
#2- Special Education/Student Interaction Issues	2.10	6.56	59.08
#3- Student Safety/Teacher Contract Rights	1.69	5.26	64.34
#4- Student Behavior/Curricular Modification Issues	1.53	4.77	69.19

Conclusions and Recommendations

As educational litigation becomes more prevalent in modern schools, the burden on agricultural educators will continue to increase. Even with the imminence of negative financial and professional ramifications, research shows that educators do not have an adequate understanding of educational law (Andreasen et al., 2007; Cotton, 2000; Fischer et al., 2007). This lack of understanding is largely due to the absence of undergraduate educational law preparation for pre-service educators (Gajda, 2008). Traditionally, because the superintendent serves as the chief administrator and leader of the school system, most educational litigation decisions flow through them. Evaluating superintendent’s perceptions of which educational law issues are the most important and relevant to agricultural educators will aid in identifying which issues educators need to understand the most.

In analyzing the participant’s demographics, the average superintendent was a white female with a doctoral degree and leads a school district of less than 3,000 students. Furthermore, the average responding superintendent leads a county school district that offers agricultural education. We recommend replicating this study in additional regions to investigate if different demographics could influence variables. We also recommend comparing the demographics of the communities in which these superintendents serve. Legal issues may vary based on demographics in the schools and the communities. As such, various issues could be more prominent for different descriptors compared to others.

The second research objective aimed to determine the principal component analytic properties of the assessed educational law issues. The PCA extracted four principal components: 1) General Educational Law Issues, 2) Special Education/Student Interaction Issues, 3) Student Safety/Teacher Contract Rights, and 4) Student Behavior/Curricular Modification Issues. This analysis reduced the original 32 educational law issues down to the four principal components by determining correlations in the responses of the superintendents. The correlating educational law

issues primarily consisted of special education law, liabilities of extracurricular activities, and liabilities of not complying with district policy. This is consistent with the findings of Hainline et al. (2019), which found that 90–100% of superintendents came to a consensus of the importance of similar issues.

Beyond the risk of litigious concerns, it may also be helpful for agricultural educators to have a firm grasp of agricultural law issues that they can also work into their coursework to expose students to the importance of legal concerns in the food, fiber, and natural resource industries (Hamilton, 1990). While the context of which legal issues could vary, simply understanding more about legal implications that could affect their classroom could also equip them with a deeper understanding when teaching legal implications in their agricultural courses. After conducting this study, recommendations for future research would be to investigate the level of understanding that practicing agricultural educators have regarding educational law. Furthermore, we recommend investigating if any differences exist between the demographics of educational professionals and superintendents, such as age, ethnicity, education level, teaching experience, and background in CTE courses.

Certainly, because general educational law issues were the most prominent extracted component could pose a limitation as participants could have higher perceptions of importance due to the broad scope of the term. However, this result yields an important recommendation for future practice. To better prepare teachers for broad and specific legal implications in their classrooms, we recommend investigating the key issues related to general educational law that impacts agricultural educators more prominently. Following this deeper delineated understanding of key issues, we recommend implementing comprehensive professional development on educational law and its implications for agricultural education. In addition to increasing awareness, noting that many educators may be unfamiliar with educational law, we also recommend teacher preparation programs consider adding coursework or training related to educational law prior to a student graduating with an educational degree.

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Teaching Outside of the Margins: School-Based Agricultural Education Teachers' Perspectives on Globally Competent Teaching During an International Experience

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Abstract

Because of the need to produce more globally competent students, researchers have called for integrating global concepts into the agricultural education curriculum over the past decade. Despite this, many teachers have not been adequately prepared to facilitate such in practice. This investigation sought to examine Louisiana SBAE teachers' perspectives on globally competent teaching during an international experience in Costa Rica. As a result of our analysis of the data, three themes emerged (1) teaching outside of the margins, (2) global storytelling, and (3) innovative global experiences. The themes narrated the ways in which the teachers in this study articulated how they intended to create globally competent students in SBAE as a result of their international experience. The results of this investigation also illuminated a critical implication for the discipline – that if we more intimately connect the local to the global, perhaps SBAE could position itself to engage in discussions and address problems associated with diversity, equity, inclusion, and belonging (DEIB) more profoundly. Moving forward, we recommend that teacher educators and state agricultural education leaders explore how international experiences might be used as an entry point for SBAE to engage in critical conversations and understand how issues of DEIB can be addressed more effectively.

Introduction and Review of Literature

In recent decades, the globalization of our world has seemingly reshaped society's social and professional fabric (Longo & Saltmarch, 2011). This shift has led individuals to engage in more globally integrated activities across borders, which has been crucial to growing our world's economy (Myers, 2010). For individuals to be competitive in this rapidly changing workforce, it has become critical to understand how their careers have become situated in the global landscape (Cseh et al., 2019). In the U.S., public schools have a long history of striving to instill students with the knowledge, skills, and experiences needed to become productive citizens who can succeed in various careers (Rothstein et al., 2008). However, today's graduates must be prepared to live and work in a society that has become defined by unprecedented economic shifts, political stability, and sociocultural values (Pigg et al., 2022). These trends have become particularly relevant for the agricultural industry, which has been tasked with preparing future generations to succeed in a highly interconnected global economy (Radhakrishna et al., 2003). One strategy that has emerged to address such issues has been *global education* – a pedagogical approach that aims to prepare students to be productive citizens in a world in which national borders have

become increasingly blurred (Hall & Hite, 2022; Mardi, 2023; Parkhouse et al., 2015; Parmigiani et al., 2022).

To achieve this goal, educators must also be competent in teaching concepts from a global perspective (Pigg et al., 2021). The Longview Foundation (2008) described a globally competent student as having knowledge and curiosity about world history, an understanding of language, cross-cultural communication skills, and a commitment to ethical leadership (Longview Foundation, 2008). However, for students to be adequately prepared for the global age, educators must also possess knowledge and skills on a range of global issues, pedagogical approaches, the ability to teach students how to analyze data across contexts, understand multiple points of view, and have a solid commitment to ensuring students become responsible citizens of the world (Longview Foundation, 2008).

The idea of preparing teachers to be globally competent has emerged as a relatively new responsibility for teacher educators (Parkhouse et al., 2015). On this issue, Mikulec (2014) explained that the literature on global education has primarily focused on the needs of K-12 students regarding facilitating their global competence development. However, little empirical evidence has examined teachers' global education needs (Mikulec, 2014). This dearth of knowledge has become troublesome because teachers cannot instill global competence in their students without exhibiting such knowledge and skills themselves (Tichnor--Wagner et al., 2019). Further, more than ever before, students populating U.S. public schools have begun to represent more diverse cultural, ethnic, and racial identities (Institute for Educational Sciences [IES], 2020). Case in point, in 2019, more than 28% of the U.S. K-12 student population were children of immigrant parents (Institute for Educational Sciences [IES], 2020). Consequently, the expectations for teachers have expanded to exhibiting competencies such as cultural competence, an understanding of international sociopolitical and economic conditions, and the ability to recognize and adapt to different ethical, social, and political perspectives on acceptable pedagogical approaches (Hall & Hite, 2022; Mardi, 2023).

Despite the need for global competence, many teachers have not been adequately prepared to facilitate such in practice (Parmigiani et al., 2022). For example, in an analysis of more than 200 textbooks on teacher preparation, Zong (2009) found that less than 10% addressed the importance of global education. As such, a key implication from this study was that little attention had been given to global education concepts during the preparation of teachers because of the lack of quality curricular resources (Zong, 2009). This notion has been supported by additional evidence that has found a statistically significant and negative relationship between teachers' beliefs about global education and their intent to integrate such into their curriculum (Zhao, 2010). Therefore, although teachers perceive global education positively, they often do not intend to teach concepts from a global perspective (Zhao, 2010).

Because of the need to produce more globally competent students, researchers have called for integrating global concepts into the agricultural education curriculum over the past decade (Conner et al., 2017; Conner & Roberts, 2013; Foster et al., 2014; Wright et al., 2019). Globally competent teaching refers to the "...knowledge, skills, mindsets, and values needed to [teach students] to thrive in a diverse, globalized society" (Tichnor-Wagnor et al., 2019, p. 3). At the university level, Bletscher et al. (2022) reported that agriculture majors received failing grades when tested on their knowledge of international agricultural issues and policy. Perhaps even

more concerning was the finding that non-agriculture majors received higher scores than students who majored in agriculture on these concepts (Bletscher et al., 2022). Meanwhile, in school-based agricultural education (SBAE), empirical evidence has been conflicted regarding the global preparedness of teachers and students to address complex issues in the 21st Century (O'Malley et al., 2019; Heinert et al., 2020; Wingenbach et al., 2003). For example, Heinert et al. (2020) found that SBAE students generally held positive attitudes, beliefs, and understanding of international agricultural concepts. However, other empirical evidence has suggested that SBAE students and teachers lack knowledge of different cultures, people, and issues (Roberts et al., 2020; Wingenbach et al., 2003). Consequently, more work has been needed to understand how best to prepare SBAE teachers to equip their students with the dispositions, knowledge, and skills needed to navigate a globally integrated society.

On this point, some researchers (Brooks & Williams, 2001; Gorter et al., 2020) have called for using international experiences to expand SBAE teachers' perspectives on globally competent teaching. For instance, Brooks and Williams (2001) found that after teachers participated in an international experience in Costa Rica, they felt more prepared to teach concepts in SBAE from a global perspective. Similarly, after an international experience in Ecuador, Gorter et al. (2020) reported growth in teachers' attitudes, beliefs, classroom practices, and personal and professional pursuits. Although these findings have been encouraging, insufficient evidence has examined the role of international experiences in shaping SBAE teachers' perspectives on globally competent teaching. The lack of knowledge of this phenomenon inspired this investigation.

Conceptual Framework

Tichnor-Wagner et al. (2019) model of globally competent teaching emerged as the most appropriate lens to interpret the findings of this study. The model suggests that globally competent teaching results from 12 distinct elements that can be delineated using teachers' (a) dispositions, (b) knowledge, and (c) skills. Through this lens, dispositions reflect teachers' attitudes, beliefs, and values using verbal and nonverbal communication approaches. Regarding dispositions, Tichnor-Wagner et al. (2019) explained that teachers should have the appropriate professional attitudes, beliefs, and values to educate students from a global perspective effectively. Therefore, globally competent teachers should embrace diversity, human rights, and differences among all people. In particular, Tichnor-Wagner et al. (2019) argued that two critical dispositions influence globally competent teaching: (1) a commitment to equity worldwide and (2) empathy and valuing multiple perspectives.

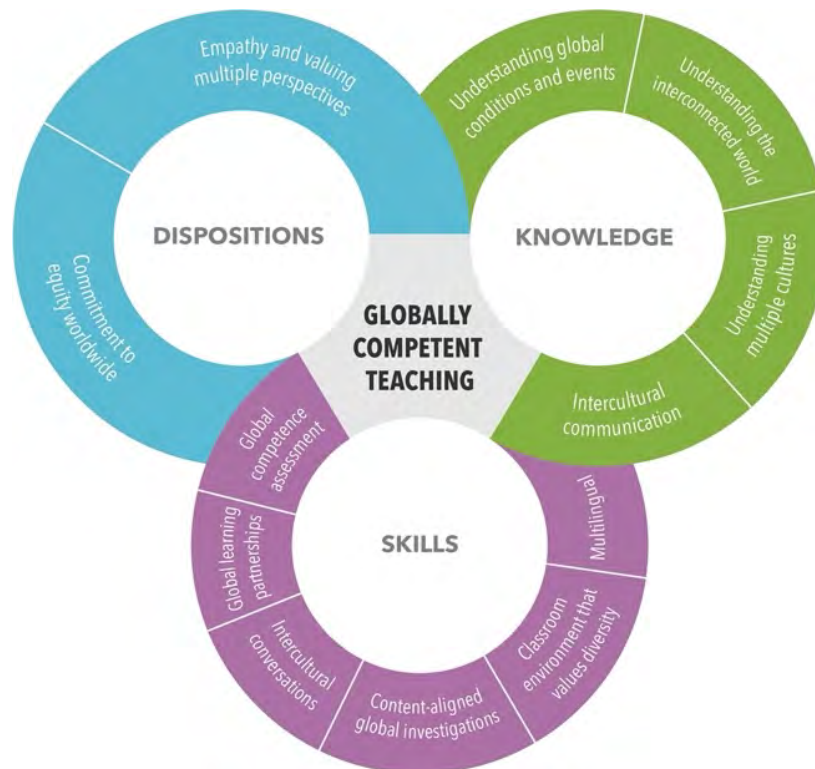
Meanwhile, the knowledge component of the model refers to teachers' interdisciplinary understanding of various cultures, events, and systems across the globe and the ways in which they interconnect. Globally competent teachers should also have a combination of disciplinary and interdisciplinary knowledge to adequately explain how various cultures, events, and systems function around the world. As such, four key elements comprise global knowledge: (1) understanding of global events and happenings, (2) understanding of how the world is interconnected, (3) experiential understanding of multiple cultures, and (4) understanding of intercultural communication.

The final component of the model suggests that teachers must integrate their dispositions and knowledge into their teaching practices to have the *skills* needed to prepare their students for the

world. Accordingly, skills represent what teachers, across levels and subjects, should be able to accomplish when using globally competent teaching as they "...pla[n] for instruction by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context" (Tichnor-Wagner et al., 2019, p. 24). Consequently, globally competent teaching includes six primary skills: (1) communicating in multiple languages, (2) creating a classroom environment that values diversity and global engagement, (3) integrating learning experiences for students that promote content-aligned explorations of the world, (4) facilitate intercultural and international conversations, (5) develop partnerships that provide real-world contexts for global learning opportunities, and (6) develop and use appropriate methods of inquiry to assess students' global competence development. In the current investigation, the model helped us make sense of teachers' perspectives on globally competent teaching in SBAE during an international experience in Costa Rica. For example, we used the model to compare our emergent findings to those espoused by Tichnor-Wagner et al. (2019) and noted when similarities and discrepancies occurred. This process helped us emerge the themes of this investigation. Figure 1 provides a visual representation of Tichnor-Wagner et al. (2019) model of globally competent teaching.

Figure 1

Tichnor-Wagner et al. (2019) Model of Globally Competent Teaching



Background of the Study

In this study, eight SBAE teachers from Louisiana were selected to participate in a one-week international experience in Costa Rica, which was funded through a USDA-NIFA grant. While in Costa Rica, the teachers had the opportunity to engage with a range of academic and technical experts on issues that affected the country's agricultural industry. Through these educational and cultural experiences, our intent was for the teachers to achieve a broadened global perspective they could use to mentor 21st Century leaders prepared to solve complex problems across cultures. This was facilitated through five programmatic focus areas: (1) coastal loss sessions with scientists in Costa Rica, (2) STEM-focused site visits, (3) cultural tours, (4) the development of instructional case studies, and (5) reflective sessions to that helped the teachers make connections to their experience and the SBAE curriculum in Louisiana.

During the international experience, the teachers were introduced to issues concerning (a) animal science, (b) coastal loss, (c) coffee and cacao production, (d) environmental education, (e) plant science, and more. As the teachers interacted with experts and gained a deeper understanding of issues and problems affecting the industry, they collected four forms of data: (1) audio recordings of interviews with experts, (2) documents, (3) photographs, and (4) video. The teachers used this data to create instructional case studies, 24 total, that were later distributed to SBAE teachers in Louisiana to globalize an existing curriculum. Our intent when employing this approach was to provide teachers with the resources to support globally competent teaching in Louisiana SBAE.

Purpose of the Study

This investigation examined Louisiana SBAE teachers' perspectives on globally competent teaching. The study aligned with the American Association for Agricultural Education's National Research Agenda Research Priority 3: *Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century* (Stripling & Ricketts, 2016). Because of changing demographics that affect interactions within the agricultural industry, it has become critical for future agriculturalists to exhibit global competence (Stripling & Ricketts, 2016). One research question framed the study: What were Louisiana SBAE teachers' views on how to foster global competence for their students during an international experience in Costa Rica?

Methodology

In the design of this study, we grounded our decision-making in the epistemological position of constructionism (Crotty, 1998). Constructionism seeks to help make sense of how individuals' experiences and interactions help them make meaning of the world around them. Through this worldview, we chose to use Stake's (1995) instrumental case study design to achieve this investigation's purpose. A case study approach can help provide rich insight into a bounded system (Stake, 1995). In this study, the case was bounded by career and place; for example, all participants were SBAE teachers from Louisiana who were selected to engage in an international experience in Costa Rica. Although case studies using a qualitative design typically cannot be generalized, findings can often be transferable to similar contexts (Stake, 1995).

The teachers ($N = 8$) were selected using a competitive application process in which we emphasized diversity regarding teaching experience and licensure pathway. The participants'

teaching experience varied from three to 28 years, with six identifying as female and two as male. Meanwhile, the teachers were evenly divided regarding their licensure route, with four being traditionally certified and the other four having received licensure through an alternative certification pathway.

Reflexivity

In qualitative research, it is critical to address the assumptions, biases, and decisions that influence the investigation (Creswell & Poth, 2016). Therefore, it was important to reveal that the two lead investigators were teacher educators in Louisiana and sought grant funding from USDA-NIFA to facilitate the international experience to Costa Rica. It is also essential to divulge that we work closely with SBAE teachers in Louisiana and had previous professional relationships with all participants in this study. We also traveled abroad extensively and led student groups on study abroad experiences. We also want to disclose that we were responsible for coordinating all activities during the international experience and were present throughout the teachers' time in Costa Rica. The other researchers in this investigation also had international experience. Although they were not present in Costa Rica, they assisted with the data analysis and helped provide an outsider's perspective to help reduce our biases and prejudices that could have negatively influenced our interpretation of the data. We recognize that our experiences and perspectives influenced this study. However, ethical decision-making was emphasized throughout all aspects of the investigation.

Data Sources and Analysis

During the international experience, the teachers were required to submit the following reflective items: (a) audio reflections of their most salient experiences abroad, (b) a photograph and caption of their most significant cultural takeaway, and (c) a photograph and caption of their most significant teaching takeaway. As a result, we analyzed 56 audio recordings and 112 photographs and captions as data for this investigation. Further, we also conducted persistent observations and a two-hour focus group interview with all eight participants on the final day of their experience abroad in Costa Rica.

After the data were collected, we employed Saldaña's (2021) qualitative coding procedures to analyze each data source. Saldaña (2021) explained that a code is "...often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (p. 4). As such, we used structural, descriptive, and in vivo approaches in our first cycle of coding to examine the data using multiple lenses (Saldaña, 2021). This process resulted in 812 first-cycle codes. Next, we utilized axial coding to examine the existing relationships among the first-cycle codes and reduce them to categories. At this point, we met as a research team to negotiate our categories to ensure they made sense in the context of this investigation. During this phase, we also employed thematic analysis to distill our findings further and emerge the study's three themes.

Rigor and Trustworthiness

In this investigation, we weaved Lincoln's and Guba's (1985) standards for rigor and trustworthiness – confirmability, credibility, dependability, and transferability – into each phase to ensure rigor and trustworthiness. Confirmability represents whether researchers have been open and honest about their biases and sources influencing their decision-making. To uphold the standard of confirmability, we (a) fully described our methods and procedures, (b) were transparent about our experiences and relationships that influenced this investigation, and (c) considered alternative interpretations of the data. The second standard, credibility, speaks to whether the findings ring true in the context in which the data were collected. As such, we provided context-rich descriptions, triangulated findings using multiple data sources, and made sure that our conclusions made sense in context. Dependability, the third standard, addresses whether the investigation was carried out in a systematic way that aligned with standard practices in qualitative research. To achieve such, we (a) collected data that aligned with the purpose of the study, (b) specified the philosophical paradigms that we drew upon when designing and carrying out the investigation, and (c) ensured that the study aligned with standards of case study research as advanced by Stake (1995). For the final standard, transferability, researchers should consider if the findings could be transferred to similar contexts. To fulfill transferability, we were clear about the parameters and limitations of this investigation while also attempting to provide an accurate description of our procedures to conduct the study and the funding that we received to carry out an international experience for SBAE teachers to Costa Rica.

Findings

As a result of our analysis of the data, three themes emerged (1) teaching outside of the margins, (2) global storytelling, and (3) innovative global experiences. The themes narrated the ways in which the teachers in this study articulated how they intended to create globally competent students in SBAE as a result of their international experience.

Theme #1: Teaching Outside of the Margins

During their time in Costa Rica, the teachers began to voice a shift in their thinking in regard to teaching agricultural and environmental concepts that extended *outside of the margins*. In particular, they began to talk about the need to feature the experiences of marginalized populations when teaching. For example, Participant #7 said: "I am beginning to understand that teaching ag is more than just about teaching facts but also changing the hearts and minds of my students to [create a more] just world." On this point, Participant #2 shared: "when I get back home, I want to make sure to teach about how agriculture has a great diversity of people, traditions, and practices. I need to [do a] better job highlighting that diversity in my ag classes." Participant #4 also began to ponder more deeply why agriculture has been riddled with inequalities throughout the world. She reflected: "there is a lack of machinery and technology [in Costa Rica]. So much of what they do here is primitive. I need to talk more about [the history] of this to my students." She continued: "I think talking about the privileges we have access to [in the U.S.] in agriculture are not realized or considered by my students."

Tichnor-Wagner et al. (2019) explained that for teachers to be globally competent, they must have a commitment to *equity*. In the current study, the teachers' commitment to equity appeared to surface through becoming more critically conscious. Case in point, Participant #1 explained:

“this trip has made me aware that my understanding of ag is based on my own experiences and people [in other countries] have completely different assumptions of the industry, and that is okay.” Participant #1 further shared: “when I get back to my classroom, I think I will talk more about how what we consider right and wrong in ag is based on what we know.” He continued: “I need to do a better job with my students about helping them understand that other countries may do something different because they do not have the knowledge or the money to do it like us, and that’s fine.” In a similar sentiment, Participant #8 reflected: “I take for granted how wealthy we are as a nation. I teach my students about how we are the greatest ag power in the world.” She further shared: “However, I think this trip opened my eyes about how I need to teach my students about why this is the case and how we can help other countries ag industries more.” In our observations, we also noted that the participants began to talk informally about how to engage their students in conversations about inequalities and how to address such through teaching.

During our observations, we also noted that the teachers often compared women's roles to men in Costa Rican agriculture. Further, they probed various experts they interacted with about women’s issues. During the focus group, we asked about their interest in this topic. When prompted, Participant #6 explained: “I think that because I am a woman in agriculture in the United States, I take for granted my ability to take on various roles and responsibilities in the industry.” She continued: “I often get questions from students about why I am an ag teacher since it has historically been a male-dominated profession and industry.” Similarly, Participant #1 shared:

...when I go home, I want to be able to accurately explain the differences between women and men in agriculture here [in Costa Rica]. It’s a conversation that comes up a lot, and I usually try to avoid it. I think this experience has helped me see that I need to talk about gender differences with my students more.”

Therefore, the teachers in this investigation explained how key interactions during the international experience opened their eyes to how power dynamics and issues of equity influenced the agricultural industry – a notion deeply rooted in Tichnor-Wagner et al. (2019) work. Through these experiences, the teachers spoke about how they hoped to make changes to their approach to teaching to feature these issues in their classrooms better moving forward.

Theme #2: Global Storytelling

As a result of the teachers’ shifts in global thinking during their time in Costa Rica, they began to ponder ways to instill this perspective in their students – a notion that was not included in Tichnor-Wagner et al. (2019) model. Perhaps the most common strategy the teachers articulated was how to use storytelling to resonate with their students to build empathy and have them more authentically engage in global problem-solving. For example, in their daily reflections, teachers often included specific stories about their time in Costa Rica that they wanted to share with their students. In particular, Participant #5 explained: “I got so many pictures during our site visit to the repurposed hydroponic system at C.A.T.I.E University. I have a hydroponic system at school, and it’s going to be so cool to compare the systems with my students.” Meanwhile, we observed Participants #1 and #6 capturing video throughout the international experience. When asked why they did such in the focus group interview, Participant #1 shared: “We got the video because I do not think my recollections will be powerful enough. I want my students to really feel and

experience what I have here in an impactful way.” Participant #8 also shared during the focus group interview: “I’ve got to really think about how to talk with my students about my experiences here. I want them to feel what I have felt. So, I have to spend some time figuring out how to talk about global ag more impactfully.”

During their daily reflections, the teachers also submitted photographs of moments they deemed a *critical takeaway* (see Figure 1). Often these images represented significant *lessons learned* that the teachers hoped to take back to the U.S. to share with their colleagues, family, and students. For instance, Participant #2 submitted an image of various products derived from goat’s milk. During the international experience, the teachers had the opportunity to visit a small goat farm and observe them processing the milk to create various food products. Participant #2 explained that based on her experience at the goat farm, she was inspired to tell stories of the processes the farmers used to illuminate key STEM concepts for her students. Meanwhile, Participant #3 shared an image of how plant scientists at C.A.T.I.E. university used repurposed bottles and other recycled materials to carry out experiments to grow various flowers and vegetables. By witnessing this commitment to sustainability in agriculture, Participant #3 hoped to motivate students with minimal resources to continue engaging in the industry. Finally, Participant #6 offered an image of having an opportunity to participate in the harvesting of cocoa. Throughout this process, multiple teachers documented each phase through written instructions, videos, and photographs that they intended to return to their classrooms to demonstrate the process to their students.

Figure 1

Photos and captions from Participant's #2, #3, and #6



One of the biggest takeaways for me today was the many ways that goat's milk can be processed and used to make quality products. I enjoyed how much the goat expert focused on the STEM embedded within the process. When I return home, I hope to better highlight STEM concepts embedded within my classes – Participant #2, Photo Caption



You've got to work with what you've got! I often talk to my students about how a lack of resources in ag can't hold you back, sometimes you have to use critical thinking to solve problems. This photo will help demonstrate to my students it doesn't matter if don't have a lot of money for supplies, you can still use what have and be sustainable. – Participant #3, Photo Caption



My mind was blown today getting to harvest cocoa! I can't wait to take process back to my students, they are going to be so excited. I made sure and took notes, video, and plenty of pictures so that I can start working this into my food science class. – Participant #6, Photo Caption

The *stock of stories* brought forth by the teachers in the second theme revealed the ways in which they had internalized their experiences in Costa Rica and began to make sense of how their stories could be used in their careers. Case in point, most teachers were diligent in documenting their experiences and ensuring they could make key connections to their curriculum. Despite this, no mention of this phenomenon was expressed in Tichnor-Wagner et al. (2019) model.

Theme #3: Innovative Global Experiences

The final theme, innovative global experiences, emerged during the international experience as teachers brainstormed ways to integrate global learning into their curriculum (Tichnor-Wagner et al., 2019). For example, we observed the teachers talking informally about ways to integrate global concepts into the content they had already taught in SBAE. Further, several participants mentioned organizing an international agriculture experience that would allow teachers in Louisiana to take their students abroad. We also observed several teachers exchanging contact information with agricultural and environmental professionals they met in Costa Rica so they could arrange virtual guest lectures for their SBAE classes.

During the focus group interview, we asked the teachers about our observations. Participant #2 responded: “Yes, I am thinking about how to teach from a more global perspective now. I think the main thing I want my students to understand is how connected the agricultural industry is throughout the world.” She continued: “I am just figuring out what types of experiences will really help that click for my students.” Participant #7 also echoed this sentiment: “I do not see global learning as an add-on; I think it is embedded in what we do.” He expanded: “I am going to use pictures that I have taken here in my ag mechanics classes to get them to problem-solve ways that Costa Ricans could use basic design principles we learn in class to address problems in crop production here.” Meanwhile, Participant #6 explained: “I am trying to figure out an activity I can do to highlight the different philosophies between the U.S. and Costa Rica toward agriculture, sustainability, and environmental education.” She continued: “I think I just need to do a better job of figuring out ways for my students to have the same *ah-ha* moments that I have had while in Costa Rica.” Therefore, the international experience in Costa Rica made the teachers in this study ponder more deeply how they could more impactfully integrate innovative global experiences into the SBAE curriculum. To this point, #5 passionately explained:

I think we have to change our mindset and then help the ag teachers back home change their mindset. We need to go back and talk about things that we learned and the sustainable agricultural practices that they're incorporating in Costa Rica. There are small tweaks that our ag programs in Louisiana can make to do a better job teaching ag concepts from a global perspective. One of the professors from EARTH University [said], that it doesn't have to be 2,000 people that change the world, it could just be one. So, I think if we make small changes it could start to trickle over and take our ag programs to the next level.

By deeply pondering ways to create innovative global experiences for their students and other SBAE teachers in Louisiana, the teachers in this investigation activated critical global competence skills as advanced by Tichnor-Wagner et al. (2019). For example, the teachers began to discuss ways to embrace diverse perspectives and practices. Further, they also considered new ways to align their content with global concepts (Tichnor-Wagner et al., 2019).

Conclusions, Discussion, Implications, Limitations, and Recommendations

This investigation examined Louisiana SBAE teachers' perspectives on globally competent teaching. Through our analysis of the data, we demonstrated that the teachers expressed three primary strategies they intended to use to foster global competence for their students as a result of their international experience: (a) teaching outside of the margins, (b) global storytelling, and (c) innovative global experiences. Consequently, we concluded that this short-term international experience for SBAE teachers appeared to expand their perspectives on globally competent teaching positively. In the current investigation, we used Tichnor-Wagner et al. (2019) model of globally competent teaching to ground our study conceptually. It should be noted that although two of our themes aligned with concepts expressed in the model, one theme did not. Further, multiple elements outlined in the model were not articulated by the teachers in this investigation. As such, we conclude that the SBAE teachers in this investigation should not be considered fully globally competent; instead, their global identity appeared to be still emerging. Therefore, we recommend that future research examine whether Tichnor-Wagner et al. (2019) model should be revised to reflect different phases of global competence.

In the first theme, teaching outside the margins, the SBAE teachers reported shifts in how they intended to teach agricultural and environmental concepts. For example, they suggested the international experience motivated them to teach their students how marginalized populations in other countries were impacted by various issues and problems in the agricultural industry – a notion supported by existing research (Pigg et al., 2020, 2021]). Further, the international experience also appeared to awaken a critical perspective among the teachers in which they began to question structures of power and the marginalization of various populations, such as women in agriculture. Although this notion has been expressed in literature on studying abroad with university agriculture students (Pigg et al., 2021), the sentiment has not been reported for SBAE teachers. In the broader literature, this growth has been described as helping teachers mature regarding their critical consciousness to advance issues of equity in the classroom from a global perspective (Parkhouse et al., 2015). Therefore, we recommend that future research examine how developing a critical consciousness through international experiences for SBAE teachers may positively influence teaching and learning about equity for marginalized populations. We also recommend that researchers explore ways to facilitate such growth through domestic and virtual experiences that would likely be more economically feasible.

In the second theme, global storytelling, the SBAE teachers began to ponder how to articulate their global experiences in ways that would resonate more impactfully for their students – a concept that does not appear to have been reported in the literature on international experiences for SBAE teachers. In particular, the teachers documented their thoughts in their journals, captured videos, and images they hoped to share with their students to help them better understand concepts from a global perspective. We recommend that future research explore strategies that may help teachers better narrate their lived experiences abroad in ways that can lead to growth in their students' global perspectives and knowledge. We also recommend that future investigations explore whether pre- and post-departure sessions on global storytelling could positively impact teachers and their colleges, students, and families.

The final theme explored how the international experience motivated the SBAE teachers to consider new ways to integrate global learning into their curriculum – a sentiment supported by previous work (Brooks & Williams, 2001; Gorter et al., 2020). Unique to this study, however, were the innovative strategies that the teachers planned to use to globalize their curriculum. For instance, the teachers expressed a desire to lead international experiences for their SBAE students in the future. Further, they also spoke about ways to inspire other SBAE teachers in Louisiana to expand their global competence and positively influence their students. Moving forward, we recommend that future studies examine this notion using a larger sample size and in different contexts to understand whether an international experience can lead SBAE teachers to globalize their curriculum using practical strategies. Further, future research should also explore the multiplier effect that an SBAE teacher participating in an international experience may have on their students, colleagues, family, and friends.

Infusing global competence in the curriculum will not be a radical departure from existing beliefs and practices espoused in SBAE (Brooks & Williams, 2001; Gorter et al., 2020). For example, discussions of diversity, equity, inclusion, and belonging (DEIB) have often been deepened and became more nuanced when global perspectives were included (Tichnor-Wagner et al., 2019). Consequently, this investigation illuminated a critical implication for the discipline: if we more intimately connect the local to the global, perhaps SBAE could position itself to engage in

discussions and address problems associated with DEIB more profoundly. Moving forward, we recommend that teacher educators and state agricultural education leaders explore how international experiences might be used as an entry point for SBAE to engage in critical conversations and understand how issues of DEIB can be addressed more effectively.

It is also important to note that this investigation had multiple limitations. First, this international experience for SBAE teachers was expensive. We could only carry out the endeavor because we received grant funding from USDA-NIFA. However, due to the positive outcomes of this international experience, we recommend that teacher educators explore ways to make leading international experiences for SBAE teachers more affordable. Perhaps by combining resources or creating a nation-wide scholarship fund, teachers from across the U.S. could engage in similar experiences in the future. Another limitation of this study was that the international experience was short-term in design – lasting only one week. We recognize that allowing the teachers to have a more long-term international experience would likely have led to more transformative outcomes. However, this was not possible due to the hectic schedules of the SBAE teachers in Louisiana and limited financial resources. As such, we recommend that future research examine the differences among teachers who engage in short versus long-term international experiences. With this knowledge, funding agencies maybe more open to supporting long-term international experiences for teachers.

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Attempts Toward Blended Teaching and Personalized Learning in School-Based Agricultural Education

Abstract

The purpose of this study was to explore school-based agricultural education (SBAE) teacher beliefs about personalized instruction and blended teaching and their experiences with implementing personalized learning within their blended teaching practice. The specific research questions that guided our study were 1) what are SBAE teachers' beliefs about personalized instruction and blended teaching? and 2) how have they personalized instruction within their blended teaching practice? We utilized a hermeneutic phenomenological research design while relying on theoretical research on teacher beliefs to illuminate the experiences of SBAE teachers in blended classrooms. Participants included five in-service agriculture education teachers representing four states in the United States. These participants were identified by post-secondary agriculture education teacher educators through a state database of SBAE teachers. All self-identified as SBAE teachers that practiced blended teaching. Three themes emerged from data analysis: time, place, pace, and path; empowering students; and reality check. Our findings indicate that the beliefs SBAE teachers hold influence their classroom practices and personalized learning and student choice were important. Recommendations for future research include conducting observational research on personalized instruction in blended settings as well as the impact contextual factors have on the relationship between teachers' beliefs and practice in blended classrooms.

Introduction and Literature Review

Throughout 2020 and 2021 teachers across the United States were forced to facilitate remote learning through a variety of asynchronous and synchronous methods, mediated by online learning platforms (Cahapay, 2020). School-based agricultural education (SBAE) programs were not immune to the impacts of COVID-19 government responses (McKim & Sorensen, 2020), and just like other areas of education, SBAE classes shifted to reduced, modified, or remote teaching and learning through asynchronous and synchronous instruction. During this time, many K-12 teachers and teacher educators discovered that they were unprepared for the challenges of online teaching, lacking both the skills and resources they needed to effectively use the technology and online learning platforms (Short et al., 2021).

Roberts et al. (2016) noted that effective teaching can be obstructed by pedagogical constraints, such as technological advances. The technology used by teachers to enhance classroom instruction and student learning is constantly changing due to rapid and continual technological advancements (Coley et al., 2015; Kotrlik et al., 2003; Martin & Carr, 2015; Stewart et al., 2013). Educational technologies and online communications are ever-present in society, and as a result, 21st-century students, parents, and teachers are demanding an education that reflects the 21st century (Roberts et al., 2016). It is through technological integration that students can engage with content and curriculum in ways that are more meaningful, with a greater connection to the real world (Hechter & Vermette, 2013). As students develop and demonstrate digital proficiency through their constant contact with technology, it is worth considering how technology can be purposefully adopted and implemented in learning environments to facilitate personalized learning. However, technology adoption and

implementation must be supported by pedagogical practice (An & Reigeluth, 2011; Ertmer & Ottenbreit-Leftwich, 2010; Graham et al, 2009; Kotrlik et al., 2003; Ottenbreit-Leftwich et al, 2010). One way to explore the connection between technology and pedagogical practice is by examining the role that both play in blended learning.

Blended learning instructional design has been widely adopted by institutions of higher education (Bonk & Graham, 2006; Bruggeman et al., 2021; Dziuban et al., 2018), and subsequently, a wide variety of empirical and conceptual literature regarding adoption and implementation at the post-secondary level exists (Anthony et al., 2020; Bonk & Graham, 2006; Borup et al., 2011; Brown, 2016; Graham et al., 2013). However, empirical research focusing on the K-12 setting is considerably less prolific, although the body of this literature is expanding (Graham et al., 2019). Poirier et al. (2019) asserted that K-12 blended learning research has been primarily exploratory, focusing on defining blended learning and investigating the various models used in classrooms (e.g., flex, station rotation, a la cart). Furthermore, much of the empirical research on blended learning in the K-12 settings has focused heavily on STEM subjects (Attard & Holms, 2020; Borba et al., 2016; Seage & Türegün, 2020), and English language acquisition or reading (Kazakoff et al., 2017; Macaruso et al., 2020; Prescott et al., 2018; Schechter et al., 2015;), with little addressing other content or subject areas. Despite an abundance of research on blended learning in both the K-12 and post-secondary settings, blended learning has remained absent from SBAE research.

Defining blended learning in light of current educational and instructional technologies (e.g., computers, internet, learning management systems) is challenging, as it has been ill-defined and there is no commonly agreed-upon definition for a complex learning and teaching system (Dzuiban et al., 2018; Norberg et al., 2011; Oliver & Trigwell, 2005). Garrison and Kanuka (2004) defined blended learning as “the thoughtful integration of classroom face-to-face learning experiences with online learning experiences” (p. 96) while Graham (2006) noted that there were three commonly mentioned definitions of blended learning: the combination of instructional modalities, the combination of instructional methods, and the combination of online and face-to-face instruction. Although both of the widely cited definitions above identify a foundational component of blended learning, the combination of online and face-to-face learning, neither definition describes the full potential of implementing blended learning in classroom settings.

Horn and Staker (2015) expanded on these commonly used definitions of blended learning and argued that three distinct components must be present in a blended learning environment. These three components are 1) a formal education program that facilitates student learning, at least in part, through online learning, and provides an element of student control over time, place, path, and/or pace, 2) student learning happens, at least in part, in a supervised brick-and-mortar location away from home, and 3) learning experiences for each student are purposely coordinated between the modalities (brick-and-mortar and online). Much like other prominent definitions found in empirical literature (Garrison and Kanuka, 2004; Graham, 2006), Horn and Staker (2015) addressed the importance of face-to-face and online learning while also bringing to light additional details and components that help to operationalize blended learning and highlight the potential for personalized learning.

Personalized learning is when learning experiences are tailored to the individual student and their unique needs (Horn & Staker, 2015). These needs might include learning preferences, relevant learning goals, personalized experiences, and student-specific support (An & Reigeluth, 2011). The pedagogy of personalized learning is situated in learner-centered pedagogy and relies

on teaching methods that encourage students to actively participate in the learning process as they investigate, inquire, discover, and create personal meaning through their learning (Krahenbuhl, 2016; Tahirsylaj, 2017). McCombs and Whisler (1997) define *learner-centered instruction* as a focus on the specific experiences, perspectives, talents, interests, backgrounds, and needs of the individual learner coupled with the best teaching practices that prompt high levels of motivation, learning, and achievement for each individual. In learner-centered instruction, the teacher is no longer the purveyor or transmitter of knowledge, or the voice of intellectual authority (An & Reigeluth, 2011; Knowlton, 2000; Schiro, 2008). The learner takes on an active role in the learning process, becoming a participant in developing and understanding the learning materials. Additionally, students in a learner-centered classroom actively engage in the learning process and work at a pace that supports their individual needs. Students then have the ability to develop a sense of agency and ownership for their learning through the ability to guide their own learning (Horn & Staker, 2015, Knowlton, 2000).

Horn and Staker (2015) identified four key elements, or means of engagement, essential to defining blended learning and allowing learners to have some form of control or personalization over their learning, which is critical to blended learning. These four means of engagement are time, place, pace, and path, and have been identified by other researchers as key to creating an environment suitable for blended learning to occur (Basham et al., 2016; Graham et al., 2019; Norberg et al., 2011). Pulman and Graham (2018) conducted a literature review of online and blended learning teaching competencies and concluded that the number one competency for teaching in K-12 blended learning and online learning contexts was flexibility and personalized pedagogy. (Pulman & Graham, 2018). This supports the need to focus attention on the four means of engagement of blended learning identified by Horn and Staker (2015) that addresses student choice, personalization, and student control over learning.

Time refers to when students will have access to learning materials and activities to learn (Graham et al., 2019; Horn & Staker, 2015). For example, a student may access the learning materials and activities during assigned class time, prior to, or after class. Often teachers may utilize lectures or other time-sensitive activities that students cannot retrieve or access if they are not present when the activity occurs. Students who are absent, for any reason, miss out on these time-constrained elements of the learning experience (Graham et al., 2019; Horn & Staker, 2015). Given enough time with quality instruction nearly all students will learn (Bloom, 1968); when students, or the instructor, are absent, time becomes a limiting factor (Norberg et al., 2011). *Place* refers to where students can access the course materials and participate in learning activities (Graham et al., 2019; Horn & Staker, 2015). Place is closely linked to time (Norberg et al., 2011). With current technologies, learning can occur in a variety of settings and locations (Horn & Staker, 2015). For example, students can access course content and participate in learning activities in a wide variety of settings including face-to-face instruction in the assigned brick-and-mortar classroom or outside the classroom via virtual means like online discussions, chat groups, or pre-recorded lectures (Graham et al., 2019; Horn & Staker, 2015). *Pace* accounts for the speed at which students choose to work through the assigned materials or content (Graham et al., 2019; Horn & Staker, 2015). Pace takes into consideration that students have unique and individual learning preferences which impact the speed at which they are able to complete work (Graham et al., 2019; Horn & Staker, 2015). Pace also encompasses self-directed learning in which students are able to interweave their personal interests within the content (Graham et al., 2019; Horn & Staker, 2015). Lastly, *path* is concerned with how a student chooses to progress through learning activities (Graham et al., 2019; Horn & Staker, 2015). Path

can also refer to the personalization of the content to meet the needs and interests of the student. This allows students to select activities or other learning opportunities that best support their preferred way of learning (Graham et al., 2019; Horn & Staker, 2015).

It is important to note that blended learning, by definition, focuses on how students engage with course content and the learning environment. Moving forward, we focus on *blended teaching* – or the practices teachers use to facilitate the blended learning environment – while drawing from the definition of blended learning established by Horn and Staker (2015). Blended teaching is the purposeful integration of a formalized online and face-to-face instructional program that incorporates student choice and personalization. Student choice and personalization are achieved through an awareness of how time, place, pace, and path impact student learning.

Conceptual/Theoretical Framework

For this study, we relied on theoretical ideas consistent with research on teacher beliefs to explore SBAE teachers' beliefs about personalized learning in SBAE contexts and how those beliefs were demonstrated through practice. All teachers hold beliefs (Bruggeman et al., 2021; Buehl & Beck 2014; Parajes, 1992), including beliefs about pedagogy and pedagogical practices (An & Reigeluth, 2011; Coley et al., 2015; Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al. 2012; Tonderu et al., 2016). Simply stated, beliefs held by teachers are strongly connected to their behaviors, decisions, and actions related to how teaching is enacted into classroom practice (Bruggeman et al., 2021; Guerra & Wubbena, 2017; Parajes, 1992; Speer, 2005; Tondeur et al., 2017). Teachers use their beliefs to make decisions about teaching in general (Bruggeman et al., 2021), interpret and plan (Parajes, 1992), and select specific instructional strategies or tools to implement into classroom practice. (Tondeur et al., 2017).

Research on teacher beliefs often identifies a distinction between professed beliefs, (what teachers say they believe) and attributed beliefs (what is reflected in their practice; Speer, 2005). However, it has been noted that perceived inconsistencies between beliefs and practices arise when professed beliefs and attributed beliefs are cleanly and distinctly separated. Additionally, it is possible that teacher beliefs and practices may be intentionally or unintentionally inconsistent with one another (Speer, 2005). Ernest (1989) identified three causes that could potentially account for the perceived inconsistencies between professed and attributed beliefs. First, teachers may be aware of the lack of connection between their professed beliefs and their other beliefs and knowledge, especially pedagogical knowledge. If the connection between professed beliefs, other beliefs, and knowledge is weak then there will be a disconnect between professed beliefs and the practices used to teach (Ernest, 1989). Second, awareness of and reflection on beliefs lead toward greater integration of beliefs and practice. This includes the ability to integrate beliefs and classroom practices as well as reconcile conflicting beliefs (Ernest, 1989). Third, social context is a powerful influential factor when examining teacher beliefs and classroom practices. Circumstances, whether logistical or practical in nature, may prohibit teachers from enacting their beliefs in their classrooms (Ernest, 1989; Speer 2005; Wilson & Cooney, 2002). These circumstances may include the curriculum to be taught, available resources, texts, high-stakes assessment, and administration, to name a few.

Purpose

The purpose of this study was to explore SBAE teacher beliefs about personalized instruction and blended teaching, within the context of SBAE and their experiences with implementing personalized learning within their blended teaching practice. The specific research questions that guided our study were 1) *what are SBAE teachers' beliefs about personalized instruction and blended teaching?* and 2) *how have they personalized instruction within their blended teaching practice?* These research questions align with the American Association of Agricultural Education (AAAE) Research Priority 4, Question 1: “How do digital technologies impact learning in face-to-face and online learning environments?” (Roberts et al, 2016, p. 39).

Methodology

This study employed a hermeneutic phenomenological approach to explore teacher beliefs and blended teaching in SBAE. Rather than adhering to the tenets of descriptive phenomenology which only allows for the description of the phenomena under investigation, hermeneutic phenomenology is the philosophy of interpretation (Reiners, 2012), and experiences are viewed from the perspective of the individual in relation to their reality and the everyday world, not what they consciously know (Lopez & Willis, 2004). When interpreting and analyzing the deeper understanding of our daily experience, phenomenological research enables the findings to be used in developing practical theory and can be used to support, challenge, or otherwise inform policy and practice (Lester, 1999). The hermeneutic phenomenological researcher arguably cannot remain neutral in their investigation of the meaning of the human experience. Rather, the researcher exists within the phenomena being explored (Sloan & Bowe, 2014). Furthermore, hermeneutic phenomenology seeks to be subjective in how the phenomenon is explored and interpreted. This means that the researcher needs to be “perceptive, insightful, and discerning...to show or disclose the object in its full richness and in its greatest depth” (van Manen, 1990, p. 20). Subjectivity recognizes the strength in the researcher’s orientation to the phenomena under study while acknowledging their personal and unique connection to the phenomena, striving to avoid the pitfalls of becoming “arbitrary, self-indulgent, or of getting captivated and carried away” by their personally held preconceptions (van Manen, 1990, p.20).

How teachers make sense of their beliefs and experiences with blended teaching is essential to understanding practices, decisions, and actions related to classroom instruction. Interpretive phenomenology as a methodological approach allows us to focus on the “why” behind teachers' experiences and practices. Focusing on the why of blended teaching in SBAE goes beyond describing what teachers do, examining a checklist of tasks identified as best practices, or reviewing a list of “up to date” technology that impacts learning. The deeper meaning is connected to how blended teaching SBAE educators see themselves as teachers and the impacts of blended teaching on how they practice teaching. Moreover, teacher experiences are the foundation of teacher preparation and teacher professional development. Hermeneutical phenomenology is a tool and methodology that allows us to center teachers’ experiences and focus on how teachers are making sense of navigating their teaching contexts.

Participant Selection and Recruitment

Phenomenological research requires that all participants have experience with the phenomena being examined (Creswell & Poth, 2018). To this end, the identified population for our study was SBAE teachers in the United States who self-identified as blended teaching pedagogues and who implemented blended teaching practices in their SBAE classrooms during

the 2021-2022 school year. We purposefully sampled participants from multiple avenues to account for a lack of previous research on blended teaching and learning in SBAE. Recruitment emails were first sent through the AAAE listserv with the intent of seeking recommendations from agriculture teacher educators throughout the United States. Eleven individuals from across the United States responded to the email and recommended a total of 23 individuals. From the list of recommended individuals from AAAE, three SBAE teachers (Jill, Kathy, and Nancy) consented to participate. Additional emails were sent to members of the National Association of Agricultural Educators (NAAE), a national organization for secondary and post-secondary agricultural educators, and state and national agricultural education leaders and to the Oregon Agriculture Teachers' Association (OATA). No participants were recruited from NAAE or OATA. Upon recommendation from an individual from North Carolina State University we contacted SBAE teachers in North Carolina directly using the publicly available North Carolina Ag Ed Teacher Directory. Eighty individuals were randomly identified and contacted. Two participants (Jeremy and Julianne) elected to participate in the study. Ultimately five SBAE teachers representing California, Delaware, North Carolina, and Ohio participated in this study.

Data Collection and Analysis

We acknowledge that the COVID-19 pandemic potentially impacted data collection for this study. The data collected for this study occurred after many of the widespread shutdowns had ended and the public school system had largely returned to in-person instruction. It is in this post-pandemic context that the participants discussed their beliefs and blended teaching practice.

The primary method of data collection for our study was through semi-structured, in-depth interviews that were conducted via Zoom, a video conferencing software. Semi-structured interviews allowed us to carefully consider the purpose of the interview while providing the flexibility to ask follow-up questions (van Manen, 1990). Each interview lasted for approximately 60 minutes. Questions in the interview protocol were centered on the participants' beliefs and experiences with blended teaching in the context of SBAE. We used Otter.ai, a web-based voice-to-text transcription and translation service, to transcribe each of the five interviews. Once the transcription process was completed, the transcripts were uploaded into DeDoose, an online data analysis program. All participants voluntarily provided verbal consent for both audio and video recording and Oregon State University's Institutional Review Board (IRB) guidelines directed data collection for this study.

In hermeneutic phenomenology, the goal of the researcher is to interpret the meanings as they relate to the phenomenon under investigation. To move between the parts and the whole of texts, we employed the hermeneutic circle to review and analyze the findings (Laverty, 2007; Lindseth & Norberg, 2004; Reiners, 2012; Sloan & Bowe, 2014). This process of understanding a text occurs by examining individual parts in conjunction with the researcher's understanding of the individual parts, while also considering the context of the individual parts within the whole document (Sloan & Bowe, 2014). To enter the hermeneutic circle, we drew on the general methodology, or phases established by Lindseth and Norberg (2004) which describe a method for analyzing and interpreting hermeneutical interview text.

During the naïve reading phase, each transcript was read multiple times to gain a better understanding of the text, the ideas presented by the participants, and to take the time to record thoughts about the conversation (Lindseth & Norberg, 2004). This phase was followed by

thematic analysis through initial coding, memoing, and focused coding, which were completed based on the guidelines established by Saldaña (2009). During this phase the initial codes were organized into salient categories that made the most analytic sense to establish preliminary core themes. Once the themes and subthemes were established, we followed the validation process set forth by Lindseth and Norberg (2004) where naïve understandings were revisited to reflect on the themes to determine if they validated or invalidated our naïve understandings. Finally, to gain a comprehensive understanding of the data, the transcripts were read in their entirety once again with the naïve understanding, while keeping the validated themes at the forefront of the mind (Lindseth & Norberg 2004). During this process, we strived to keep an open mind to alternative meanings and interpretations while taking steps to be aware of our pre-existing understandings.

Study Quality

For this study, we drew on Lincoln and Guba's (1986) criteria for credibility, transferability, and dependability while applying the concept of reflexivity based on Berger (2015) and Malterud (2001). This was done in an effort to validate our study. *Credibility* was accomplished through member checking through participant feedback on data, preliminary analysis, interpretations, and conclusions, which led to an increase in credibility (Creswell & Poth, 2018; Lincoln & Guba, 1985; Lincoln & Guba, 1986). To tend to *transferability* we generated rich, thick descriptions of conversations, settings, and the participants as advised by Merriam and Tisdell (2015) and used verbatim transcriptions of the interviews as recommended by Maxwell (2013). The use of audit trails, as a way to provide transparency to data collection and management (Marshall & Rossman, 2016) was implemented to increase *dependability*. Engaging in *reflexivity* requires an acknowledgment of research bias, values, and other experiences and how this background informs data interpretation (Berger, 2015; Creswell & Poth, 2018, Maxwell, 2013) and ensuring the researcher's position is understood by the reader (Creswell & Poth, 2018).

To address researcher bias and reflexivity, it was necessary for me as the lead researcher, to acknowledge my experiences in relation to the phenomenon, consider how my experiences influenced my interpretation of the phenomenon under investigation. As a former SBAE teacher, I was the first in my school to incorporate Canvas in my courses and subsequently mentored many other teachers as Canvas was adopted schoolwide and I routinely integrated one-to-one computing with my students. I also believed that my students should connect their learning to their interests and communities, so I took steps to make this possible. Although I was incorporating technology and seeking to create a learner-centered classroom that valued many of the necessary components of blended teaching, I would not have considered myself a blended teacher. There was so much more I needed to do; however, I am confident that had I stayed in the classroom I would have taken purposeful steps to make blended teaching and learning a reality for my students and me.

Findings

The desire for the agriculture teacher to provide their students access to personalized learning opportunities was apparent in our conversations. The participants believed that personalized learning allows and encourages students to learn in ways that are best suited to their unique preferences for learning and demonstrating knowledge. One way to look at personalized learning is to draw from the definition of blended learning (Horn & Staker, 2015), student choice

and personalization are achieved through awareness of how *time*, *place*, *pace*, and *path* along with *empowering students* to make choices about what they learn and how they demonstrate learning. Additionally, participants experienced a *reality check* that reflected the inconsistencies between their beliefs about blended teaching and personalized learning and what could be realized through their practice.

Time, Place, Pace, and Path

Each of the participants identified different aspects of time, place, pace, and path as ways that blended teaching allowed them to support personalize instruction for their students. Time, as a means of engagement and personalization, was rarely mentioned by the participants while path was the element most frequently discussed.

Time and place are strongly connected to one another (Norberg et al., 2011). Generally speaking, during school hours students are in the face-to-face classroom, therefore time dictates the place where students are accessing information and where they are engaging in the learning process. In relation to time, only one participant in this study, mentioned time in the context of student learning. Jeremy noticed that “a lot of kids, if they're absent, they'll go ahead and do the work”, by reviewing the materials on his learning management systems and coming back to class prepared to move on.

When Jeremy and Nancy mentioned practices that connected with place, they did so from the perspective of their role as a teacher rather than how students were approaching learning in different spaces and places. Both Jeremy and Nancy saw blended teaching as a way for teaching and learning to continue without them physically in the same space as the students. Jeremy mentioned that he can “put an assignment up on Google Classroom or Canvas...and I know that the students are doing it”. Likewise, Nancy acknowledged that “as an ag teacher who's active at state and national levels...blended learning allows learning to go on without me here”. Both teachers believed that students could still be actively engaged in learning without them there to facilitate it because the online component of blended learning helps to mediate that.

Pace is the speed at which a student chooses to work through assigned content or materials (Graham et al., 2019; Horn & Staker, 2015). Elements related to pace, much like time, was rarely mentioned in our conversations with the participants. Kathy situated pace as not proceeding with instruction until a foundation is established, “because you're building on a foundation and so if the first level is not ready, why are we moving on to continue to build on the next level?” On the other hand, Nancy discussed pacing in her class as a way for students to self-assess if they needed to review information before moving on, or deciding to advance without remediation. Jill situated pacing similar to Nancy. Jill mentioned that if “my kids that need extra time, they can work on this as slow as quick as they want”, but she also maintained some control of student pacing so students did not “move too far ahead”. Kathy mentioned pacing more in the context of returning to the post-pandemic classroom, “if they need time, because there are things going on in their life, or their English class has a big assignment due and they need more time. I encourage them to communicate and advocate for themselves.”

Path refers to how students choose to learn, how learning is personalized to meet their needs and interests, and how students demonstrate learning (Graham et al., 2019; Horn & Staker, 2015). The participants referred to path more than any other means of engagement. Path encompasses many different ways that students could engage in learning. Each student has

different learning needs and different interests. Jill mentioned that “for one skill, I might give them 10 or 20 different activities that are related to that skill in a year”. Kathy recalled a number of examples related to path that included providing accommodations for all students based on their learning preferences, like both digital and handwritten notebooks, assignment menus, revise and resubmit options, and allowing students to demonstrate their learning in a variety of ways. Kathy also discussed that if “students request a printout, I'll print everything out for them so that they can use paper and pencil...there are students who just know themselves. They know that they're going to understand the material better if they can write it out.” Kathy goes on to say that “if typing it out is going to be the difference between you being able to communicate that answer or if writing it out is better, then they can take the test on paper.” Similarly, Jeremy mentioned that the “personalization piece is more how you want to share with me that you've mastered the material...if you want to create something tangible, a presentation, if you want to work with somebody to do something, I have given more flexibility and how they get to the end product”.

Empowering Students

Many of the participants believed that students should be involved in making decisions about their education. With focus on personalized learning in the blended classroom and learner-centeredness, students take on a different role than they might in other instructional models, especially those that rely heavily on teacher-centered pedagogy (Ertmer & Ottenbreit-Leftwich, 2010; Hancock et al. 2003; Knowlton, 2000; Krahenbuhl, 2016; Schiro, 2008; Weimer, 2002). One characteristic of the student role in the blended classroom is the ability, or opportunity, for students to be involved in making decisions about their education based on their interests, abilities, and preferences. This is partially accounted for in how students choose to learn while taking time, place, pace, and path into consideration (Horn & Staker, 2015).

Julianne expressed “I do believe in personalized instruction for all students. I believe that each student deserves instruction that will benefit them, not what benefits the majority...it is important for students to have the opportunity to choose how they learn best and to have a choice” Nancy touched on something she has experienced throughout her career as an agriculture teacher, not every student in the same class has the same interests. For her, blended teaching allows her students to find their interest and “voyage on their own learning journey” to “excavate” the knowledge they are interested in. Nancy said “...everyone sitting in an ag business class doesn't have the same interests. Everyone sitting in an animal science class certainly doesn't have the same interest...blended learning allows them to go deep into a content area that they're interested in”. Relating her own experiences and her observations of students, Kathy recounted “there's too many classes where I walk in, and kids are just zombies, like not listening, but being obedient...I would love to see a world where students learn what they're passionate about”. She proposed that the way to help students overcome a zombified state is to teach them the value of learning by giving them options, helping them find the wonder and curiosity in learning, and putting them in control of their education.

Reality Check

Despite the participants discussing the importance they place on the personalization of instruction in their teaching practice, they also recognized the realities of teaching. After

recalling the ways that she provides personalized instruction and learning opportunities for her students, Nancy admitted that "...it's not all roses and skipping through the meadow...but I believe the blended learning piece offers that personalization". Julianne acknowledged the realities of her position and the substantial challenges she faces in delivering personalized instruction to each student. She said "as an agriculture teacher, we teach a lot of students during the school year...it makes personalized instruction hard. It is difficult to meet the needs of every single student." With this Julianne added, "I have learned that I am not going to be the perfect teacher that personalizes every lesson to be individualized to each student sitting in my room, as that would be impossible." Jeremy expressed "...I have five preps every day, and so, from a teacher's sanity standpoint I need everybody to kind of be in that same general area". Kathy touched on the many responsibilities that agriculture teachers take on, like FFA advising, finance oversight, and farm management. "...the reality is I teach four preps, I'm an FFA advisor, I'm handling the accounts, and I've got a herd of sheep out of the farm...". Later in our conversation, Kathy lamented "...I would love to incorporate it every single day. But it's just not possible".

Discussion, Recommendations, and Conclusion

Participants in this study expressed positive beliefs about the need and desire to incorporate student choice and personalization into their blended teaching practice. Teachers cited that their SBAE programs were uniquely situated to personalize instruction because students build strong relationships with their teachers, presumably through years-long engagement in the program, and through an interest in helping students be successful. This meant tending to time, place, pace, and path – the four means of engagement that support student choice and personalization in blended teaching and learning systems (Horn & Staker, 2015) – along with empowering students to make choices about what they learn and how they demonstrate learning and mastery.

Time, Place, Pace, and Path

The participants were not asked direct questions about *time*, *place*, *pace*, and *path* during our conversations, instead the participants were asked to relate their experiences with supporting personalized learning opportunities for their students through their blended teaching. In relation to *time*, only one participant in this study, Jeremy, mentioned time in the context of student learning. He noticed that when his students were absent, they were reviewing the materials on his learning management systems and coming back to class prepared to move on. Although this is a legitimate connection to the role time plays in the blended classroom, time can and should include so much more than just using blended teaching as a tool to manage absent students. How can student learning extend beyond the school hours for all students, not just students who are absent?

When Jeremy and Nancy mentioned practices that connected with *place*, they did so from the perspective of their role as a teacher and how they manage their classes with technology rather than how students were approaching learning in different spaces and places using blended teaching. Both Jeremy and Nancy saw blended teaching as a way for students to still be actively engaged in learning without a teacher in the classroom; the online component helps to mediate, or manage, teacher absence. Is this a valid point of discussion? Does Nancy make a valid point when she says "blended learning allows learning to go on without me here. You shouldn't have to have me here to learn in a blended learning situation"? Or is blended teaching a solution,

particularly for SBAE teachers who often miss many days for FFA events and other professional activities? Can blended teaching keep students engaged and even when their agriculture teacher is not in the classroom?

When the participants mentioned things related to *pace*, they used words such as “building on a foundation” before moving on and students “self-assess” their needs and understanding. Jill mentioned that although she allows some student choice in pacing, she still maintained some control, so students did not get too far ahead. However, pace is an interesting element of personalization in that it tends to go against what teachers are often asked to do by administrators—create pacing guides and follow lesson plans as a way to manage the learning in their classrooms. Each of the participants casually mentioned state standards, state assessments, and other boxes that had to be checked showing that teachers taught what was required of them. How do state standards and state assessments impact personalized learning? Is the goal to check the box saying all the standards were taught so students were prepared to take a test? Or should the goal be to help students excavate knowledge that is relevant to them, at a pace that creates understanding, that lasts longer than their time in the classroom?

The participants referred to practices related to *path* more than any other means of engagement and each genuinely believed that students should have the option to choose their path of learning. However, despite making some minor references of choice boards, digital and physical notebooks, adjusting an assessment, or being cognizant of IEPs and 504 plans, the participants struggled to describe how they actually accounted for student choice in their learning path. Providing choice boards or altering assignments and assessments are just good teaching practice. And although IEPs and 504 accommodations begin to account for a student’s learning path and their individual needs, how much choice does a student have in selecting the path? Is creating a classroom environment where each student receives a personalized education and has the autonomy to make choices about their learning even possible? How many courses lock students into learning, or demonstrating their learning, in ways that are in conflict with how they like to learn or how they learn best?

Empowering Students

The participants also shared a belief that students should be involved in making decisions about their education and that blended teaching helped students make those decisions. As the role of the teacher is decentralized in learner-centered classrooms, students are empowered to take on more ownership of their own learning (Horn & Staker, 2015, Knowlton, 2000). Although this is strongly connected to the means of engagement as part of a blended teaching system, the participants moved beyond time, place, pace, and path to make connections to student engagement. The agriculture teachers in this study saw student choice as a catalyst for engaged classroom participation, discovering personal interests and goals, and sparking the desire to voyage on learning journeys. As learner-centered pedagogy is rooted in constructivism, students can be empowered, through blended teaching and learning, to extend their learning journeys beyond the classroom to their communities and surrounding environments to construct their own view of the world around them (Ertmer & Ottenbreit-Leftwich, 2010; Schiro, 2008).

Reality Check

The participants in this study provided a variety of evidence that personalization was important to student learning and that blended teaching assisted in providing those personalized opportunities. Despite the agriculture teachers professing a belief that a personalized learning environment for each student was important, there remained some inconsistencies with these beliefs as our conversations progressed. Participants emphasized the realities of teaching within SBAE, their schools, and the present education system more broadly. For example, participants referenced the number of preps they taught, the number of students in their programs, advising FFA chapters, overseeing program finances, and managing school farms as hindrances to fully realizing personalized learning in their classrooms. These reality checks demonstrate that context, in the case of these teachers, is a powerful influential factor when connecting teacher beliefs about personalized teaching to the feasibility of actual classroom practices. The contextual circumstances of many of the agriculture teachers in this study prohibited them from enacting their beliefs regarding personalized teaching in their classrooms. This coincides with what others have presented about the influence context has on teachers enacting their beliefs through their classroom practice (Ernest, 1989; Speer 2005; Wilson & Cooney, 2002). In addition, three of the participants – Julianne, Jeremy, and Kathy – mentioned that they did not have the time to personalize all the learning for all their students. Teachers making all the decisions regarding the personalization of each students' learning is differentiation, and although this is a good practice, doing this for hundreds of students would be exhausting and impossible. If students were allowed to take some control of their own learning instead of teachers arranging everything, could this alleviate some of the pressure from teachers and allow them to support personalized learning to a greater degree?

It is important to note that the beliefs discussed in this paper were drawn from comments made by the participants. The dichotomization of professed beliefs and attributed beliefs are complex, and it is not wholly accurate to categorize beliefs as such due to the many factors that could contribute to perceived inconsistencies between beliefs and practice (Speer, 2005). The personalized component, especially time, place, pace, and path, and how those means of engagement impact student empowerment to make decisions about their learning is complex. It requires buy-in from both the teacher and the learner for it to happen effectively. Additionally, this study did not explicitly explore the contextual influences that impact personalized learning in blended classrooms. However, all the participants in this study discussed contextual factors that they believe assisted or prevented them in implementing personalized learning in their respective blended SBAE classrooms. Therefore, to understand the factors that may contribute to perceived inconsistencies between agriculture teachers' beliefs and practices related to blended teaching, we recommend researchers engage in observational research of personalized learning in blended SBAE classrooms. This could shed light on how time, place, pace, and path are authentically and genuinely being implemented to encourage personalized learning and support student choice in the learning process. This could lead to a greater understanding of the impact of agriculture teachers' beliefs on their blended teaching practice, along with the factors that may lead to inconsistencies. Additionally, researchers should study the contextual factors related to teacher responsibilities and school climate to ascertain the impact context has on the relationship between teacher beliefs and practice in blended classrooms.

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Experiences of Recently Graduated Women School Based Agricultural Education Students

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Abstract

School based agricultural education (SBAE) exhibits patterns of an institutionalized gendered culture. While research on the experiences of women SBAE teachers and undergraduate students is considerable, there remains a paucity of research on women SBAE students' experiences within the high school setting. The purpose of this qualitative study was to understand how the gendered substructure has affected the experiences of women students who participated in SBAE programs through a critical feminist lens. Five overarching themes emerged from the data: Advisors Perpetuate the Culture of SBAE in Their Programs; Differing Expectations Exist Between Women and Men Students in SBAE; Enforcement of FFA Official Dress Disproportionately Affects Women Students; Gendered Interactions with Advisors, Peers, and the Community; and Women Not Seen in the Same Spaces as Men Within the Agriculture Industry. These five themes were seen throughout the total program of SBAE. Recommendations for practice include teachers continually reevaluating their personal biases and unexamined gender beliefs to ensure that they are not reinforcing gender stereotypes or promoting a gendered SBAE culture, teachers adhering to National FFA standards for inclusive official dress, and teachers carefully vetting which community members they allow to interact with their students and programs to prevent gendered interactions.

Introduction

School based agricultural education (SBAE) consists of three integrated components: classroom/laboratory instruction, Supervised Agricultural Experience (SAE) programs, and student leadership development through the National FFA Organization. SBAE prepares students for successful careers in global agriculture, fiber, food, and natural resources at the middle and secondary school levels (National FFA Organization, 2021). The National FFA Organization was founded in 1928, creating a structured system of SBAE in the United States, but women were not allowed membership until 1969. Women are, and have historically been, heavily involved in the agriculture industry and agricultural education, but were often relegated to roles not directly involved in production agriculture (Enns & Martin, 2015). However, for 41 years women were not formally allowed participation within traditional SBAE environments, creating patterns of a gendered organization (Enns & Martin, 2015).

Since 1969, the enrollment of women in SBAE has been steadily increasing. As of 2020, 44% of the National FFA membership was female (National FFA Organization, 2020). Additionally, female students in SBAE hold the majority of officer positions and annually make more money after graduating high school than female officers in non-SBAE programs (Velez et al., 2018). In Florida, female FFA officers were more willing to work outside of their comfort

zones, felt a stronger need for power and affiliation, and were described as more mature than their male counterparts (Ricketts et al., 2004). However, female students may also be less active in production agriculture-based content areas within the curriculum (Ricketts et al., 2004). While enrollment data of women students and records of their participation in SBAE programs is encouraging, these statistics have the potential to distract us from underlying issues. It becomes imperative to dive deeper into the experiences of women in SBAE to critically evaluate patterns of a gendered organization.

While research on the experiences of women SBAE teachers, graduate students, and undergraduate students is considerable (Cline et al., 2020; Enns & Martin, 2015; Kagay et al., 2015; Kelsey, 2006; Ricketts et al., 2004), there is a paucity of current research on women SBAE students' experiences within the high school setting. Even less descriptive qualitative research has been conducted to obtain in-depth data on the experiences of women students. While inequality and discrimination based on gender occurs throughout agriculture industry (Fremstad & Paul, 2020; Leckie, 1996; Trauger et al., 2008), it is important to describe its presence and effects at the high school level in SBAE.

Purpose and Research Questions

The purpose of this study was to understand how the gendered substructure has affected the experiences of women students who participated in SBAE programs in Arizona through a critical feminist lens. The central research question that guided this study was: What are the experiences of recent women graduates of SBAE programs in Arizona? Secondary questions included: (1) How has the gendered substructure affected the classroom/laboratory experiences of women SBAE students?, (2) How has the gendered substructure affected the work-based learning (i.e., SAE) experiences of women SBAE students?, and (3) How has the gendered substructure affected the youth leadership (i.e., FFA) experiences of women SBAE students?

Theoretical Framework

I applied critical feminist theory to investigate the central research question. Critical feminist research allows for collaboration between researchers and participants to avoid exploitation and objectification and to critically evaluate problematic situations faced by women and the institutions involved in creating those situations (Creswell, 2013). Feminist theory addresses many issues that have been historically left out of social science research such as identities, gender roles, comparable worth, and women's social devaluation and powerlessness within organizational structures (Franz, 1994). Within critical feminist theory lies Acker's (2012) theory of gendered organizations, which was utilized as the guiding framework for this study. Acker's (2012) theory of gendered organizations states that organizations are not gender neutral, even though many appear to be on the surface. Acker's (2012) theory works to identify why these inequities persist in organizations by looking at the gendered substructure within organizations. Acker's (2012) gendered substructure is broken down into four components: *organizing processes, organization culture, interactions on the job, and gender identity*.

The first component of the gendered substructure within Acker's (2012) theory is *organizing processes* that sustain inequalities into the roles within organizations. This substructure is seen in the rules, supervisor and management power, wages, physical design of

workspaces, and job descriptions in organizations. Organizing processes are present in SBAE throughout the classroom, SAE, and FFA. The next component in Acker's theory (2012) is the *organization culture*. This substructure is created when people throughout the organization hold unexamined beliefs about differences between genders. These beliefs then affect the actions, behaviors, and decisions of those within the organization (Acker, 2012). There is evidence that the organizational culture of SBAE contributes to perpetuating the gendered substructure. The third component of Acker's (2012) theory of gendered organizations is *interactions on the job*. Interactions that form gendered structures can occur between colleagues or between those at different levels in the organization as formal or informal interactions. Interactions on the job, as it relates to SBAE, includes interactions in learning environments. Person to person interactions or group interactions have the opportunity to either reinforce equality or affirm inequalities (Acker, 2012). *Gender identity* forms the last component of Acker's (2012) theory. The gendered structures within organizations can influence how individuals present their own gender identities and how they view others' identities. This can be seen when one's gender identity affects the way they act in management positions or how they may respond to being managed by the same or different gender. Gender identity is established early on in life and for many people it does not change, but the ideas and roles associated with one's gender identity possess much more flexibility (Kite, 2001). Students participate in SBAE during this period of self-discovery about their own gender identities making this substructure especially relevant. I used Acker's (2012) theory of gendered organizations to critically examine women students' experiences in SBAE.

Methods

I conducted this research using critical theory, which is not tied to any specific methodology. It can be applied at the micro level to individuals and at the macro level to local systems and contexts or to entire systems (Cohen & Crabtree, 2006). More specifically, I approached this study through a critical feminist lens. Critical feminist theory aims to describe inequalities between genders and explore avenues to create more equal systems (Martin, 2003). While critical feminist theory often contributes to the academic field in which it was conducted, the ultimate goal of critical feminist work is to create positive social change (Ferguson, 2017). Using critical feminist theory allowed me to evaluate the roles that gender plays in education and how institutions create inequalities (Creswell, 2013).

As the researcher in this qualitative study, I am the main tool for data collection and analysis (Creswell, 2013). Because I have this role, it is important for me to disclose my positionality to avoid bias in the collection and analysis of the data (Tracy, 2010). I identify as a white, cisgender man and have been involved in SBAE for nine years. I was a student in high school SBAE, a state officer for Arizona Association FFA, earned a bachelor's and master's degree in agricultural education, and was recently hired as a high school agriculture teacher. By reflecting on and evaluating my positionality throughout the study, I was better able to reduce bias (Tracy, 2010) and bracket my experiences (Creswell, 2013).

Participants in this study included 15 women who had participated in SBAE in Arizona. I selected the participants using maximum variation purposeful sampling to obtain data from the most information rich sources that would reveal the greatest widespread patterns and themes (Merriam, 2009). All participants must have been at least 18 years old and enrolled in at least three years of SBAE at the high school level. For recency of memory, all participants must have

been no more than three years out of high school SBAE. I chose these parameters to ensure that each participant could legally participate without consent had spent adequate time in SBAE to have meaningful experiences in the classroom, SAE, and FFA.

I collected data through in-depth, one-on-one, semi-structured interviews. Interviews lasted between 45 and 60 minutes in length, were conducted February through April 2022, and were transcribed verbatim. I utilized Zoom video conferencing software to conduct all interviews. I constructed the interview questions to capture the participants experiences in all three components of SBAE and elicit how Acker's (2012) gendered substructure of gendered organizations manifested within the participants' experiences. An example interview question was: How did the rules and code of conduct in FFA affect your experiences as a woman?

I coded the data in Nvivo 12 using a three-stage coding process of initial codes, categories, and themes. First, I examined all data and created 89 initial coded segments. Next, I reduced those initial codes into 15 categories by removing any over-lap or redundancies and looking for patterns and relationships. Lastly, I analyzed the categories and condensed them into five themes that served as the basis of my findings (Creswell, 2013). I analyzed the data using both deductive and inductive coding techniques. Deductive analysis was conducted using Acker's (2012) theory of gendered organizations (Gelo et al., 2008). I also engaged in inductive analysis to discover themes that organically emerged from the data (Gelo et al., 2008). I practiced reflexivity throughout the data collection and analysis process by examining my own position within the data and to ensure the findings were representative of the participants experiences (Tracy, 2010). I utilized three additional strategies to build trustworthiness: rich and thick descriptions in the form of participant quotes, member checking of emergent findings with participants, and memoing throughout data collection and analysis (Tracy, 2010).

Findings

Advisors Perpetuate the Culture of SBAE

The first emergent theme was the participants' advisors (i.e., teachers) were the ones perpetuating the culture of SBAE in their programs. Sometimes this culture was positive in nature, but often it contained overt and covert gendered subtext. The advisor was the primary individual who shaped how the students interacted with one another and what the program as a whole valued. In an extreme example, Octavia shared that her advisor would make sexist comments and encourage other students to go along with those comments, making Octavia feel unwelcome and uncomfortable. While outright comments of racism and sexism from advisors was not common amongst participants, this participant voice displays just how much power advisors have in shaping the culture of SBAE programs.

Penelope explained how much her chapter changed as they transitioned between advisors and by comparing differing approaches, highlights the influence an advisor has on perpetuating the gendered substructure within the organizational culture of SBAE. The SBAE program started as a place that she did not feel welcome as a woman, then when her next advisor was hired, the program became a place where everyone belonged, exemplified through an increase in student membership. On the opposite side of the spectrum, Fatima shared that her advisors in a multi-teacher program held the whole chapter to a high standard, regardless of gender, creating an

environment that perpetuated hard work rather than gendered aspects of SBAE culture. She said, "...the advisors really, I think they really made it clear to us that this program needs to be held to high standards and they held us all to high standards." Fatima further explained, "There was just no difference whether you were a man or a woman."

Advisors also perpetuated gendered aspects of wider SBAE culture in their programs through the way they assigned roles, jobs, and tasks. Many of the participants discussed their advisors assigning more physical, mechanical, livestock, and/or production agriculture related tasks and roles to men students rather than women students. The participants often encountered advisors asking for "a few strong boys" to help with something. Scarlett said, "It was like, you know, we have to go move this. Are you guys willing to do that? Or, 'hey, I need someone to throw this ag mech project together real quick', and he sends a group of guys..." Erica discussed the gendered assignment of officer positions in her FFA chapter, showcasing how this phenomenon was present within the FFA leadership component of SBAE. She shared that the Treasurer and Sentinel positions were typically reserved for men students and the Reporter and Secretary positions were typically women students.

Penelope also described an experience where her advisor would choose men students over women students for physical tasks. She said, "Classic age-old phrase of like, I need some strong men to move these things. There were times, I would say, where my best friend and I were overlooked for things because we looked very weak and fragile..." Penelope further explained that this was advisor driven because some men students were often assigned to roles that they did not want. She shared, "I was the poultry intern, and he [another student] was... the compost manager. And he was like, I don't want to do this. Like, he liked flowers and stuff." Ali did reveal a positive experience where her woman advisor did not perpetuate this gendered part of SBAE culture by refraining from assigning tasks based on gender like many of the other participants experienced. She said, "Ms. Lauda, she knows girls can do things, so she would just be like, 'oh, go do this', no matter what your gender was."

Differing Expectations Exist Between Women and Men Students in SBAE

Another theme that emerged from the data was that expectations differed for women and men students in SBAE. Many participants reported that expectations set by their advisors, other students, and themselves were more stringent for women than their men peers in FFA, leadership activities, and in the classroom during non-production agriculture and non-mechanics content. Vera expressed that the women on her FFA officer team received less leeway than the men officers. She shared, "... the boys know like they could slack off and it was okay but if those three specific girls, the president, vice president, secretary, if any of those girls showed any slack, they would get reamed." Some participants also shared that advisors and students alike held lower expectations for women students during production agriculture and mechanics content in the classroom. Maya described this sentiment held by her advisor, "...he's like a boy and that's kind of stuff you should kind of know or be good at versus like a girl who shouldn't know how to do that, so they might need more time to work with it."

Expectations for women students were also different when it came to SAE projects. Multiple participants expressed that women students were not expected to be involved with large stock animal projects. Women students were expected to have small stock animal projects or

work in other supporting roles. Erica explained that when she raised a steer it was very unusual, and men were surprised to see her in that position. Gabriel further showcased the gender roles present in SAE through her SAE project in auctioneering. She discussed that she was expected by peers and community members to run charity auctions rather than livestock auctions. She elaborated, "... a lot of women are doing charity events nowadays and those are very popular. But I want to sell cattle. I want to sell large stock. And girls haven't really been in that industry as a part of auctioneering." Ali shared that along with expectations for women to have specific projects based on gender, there were also expectations for men students *not* to have certain SAE's. She said, "Typically, it was looked down on if men would show like rabbits or chickens in our community...if you're a guy, you can't show a goat. It kind of looks weird..." Vera also expressed that her advisors' "old-school" nature led to expectations for men students to participate in agricultural mechanics, but also were not expected to participate in floriculture.

Many of the participants also put expectations on themselves to work hard and do well to prove that they were not "less than" as a woman. Beatriz said that she put expectations on herself to do well in the agricultural mechanics CDE to disprove gender bias. She shared, "...I don't have to be the best, but I will not be the worst. I will not be the reason the team loses. I don't want them to say it was Beatriz as a person or Beatriz as a woman." Gabriel shared a similar sentiment, "I've kind of been like, dang, I just want to, I want to go beat them all. I want to show them a girl can be as good as them..."

Enforcement of FFA Official Dress Disproportionately Affects Women Students

Almost all of the participants interviewed reported that enforcement of FFA official dress affected them to some degree, ranging from slight annoyance to lasting physical and emotional pain. Even though the rules for official dress were changed in 2019 allowing every student to wear what they preferred regardless of gender identity (National FFA Organization, 2019), many participants explained that their advisors still forced them to wear a skirt and pantyhose if they were women. This shows that although the explicit subtext within the organizing process gendering official dress for women students had been removed, the implicit gendered subtext restricting official dress still remains within the organizational culture of SBAE. Participants discussed that they did not feel comfortable or welcome to wear anything other than a skirt, or they saw other SBAE programs and their FFA chapters still enforcing the former rules. Claire stated, "...it was nice when it was changed to pants later, but even then, we still were required by advisors to wear [skirts]." Penelope explained that not being able to wear what she preferred caused her to be insecure and anxious. She shared, "I remember my freshman year I was pretty insecure about my body. So, when it came to the [official dress] aspect, I was really nervous about it, and I wanted to wear pants." In addition to reinforcing stereotypes on how woman should dress in a professional setting, enforcing gendered official dress also placed a financial burden on women students that was not equal to that of the men students. Ali explained the cost of always wearing pantyhose in official dress. She said, "One of the main issues was that typically [pantyhose] are expensive, so like buying [pantyhose] for the different CDEs and FFA events were kind of annoying, especially since they rip a lot."

Women students also experienced extra requirements or expectations about their appearance that men students did not share. These included specific types of heels, makeup, or

hair styles that are not explicitly required for FFA official dress within the official FFA Manual (National FFA Organization, 2022). Erica explained, “It just was interesting to be automatically put into that category. And requiring skirts, heels, always have your makeup done, have your hair done, like look presentable.” Ali also discussed an observation she made of other FFA chapters. She said, “I know some of the chapters would make the girls, put their hair in buns to look very professional. I remember talking to some of the different chapters throughout high school. So that was always weird to me.” Eleanor shared that along with still enforcing skirts, her advisor had preferences on appearance too, including wearing heels.

Gendered Interactions with Advisors, the Community, and Peers

Many of the women participants recounted experiences where they were treated differently than the men students in their SBAE programs. These gendered interactions occurred with advisors, peers, and community members. One way that gendered interactions transpired was through comments made by their advisors. Participants explained that most of the comments made to them were meant to be positive, but still made the participants feel less welcomed or discouraged from SBAE participation. Remi shared an experience where a comment made by her advisor may have had good intentions, but instead made her feel singled out and less welcome because she was a woman. She said, “...he said the girls were better welders because they're more detail oriented and they'll take more time ... he made it seem like he needed to say something to me instead of just she's a typical everyday average Joe.”

Eleanor said that her advisors' negative interactions with her and preference towards men students were part of the reason that her participation in SBAE declined during her time in the program. Men advisors preferring men students was shared by other participants as well. Vera said, “I remember Mr. Schumacher [advisor] favoring the men a lot more... It did seem like they cared more about the issues that the guys brought up.” Octavia shared that her advisor would let more men students do whatever they wanted in class because they had similar interests to the advisor and were better able to converse with him. The participants also encountered men advisors taking over what they were doing or explaining it to them even though the women students knew what they were doing, indicative of mansplaining. Ali shared this experience from her SAE project with her advisor, “He [advisor] would always like correct how I was doing something, or he knew better basically. Even though, sometimes I would just know how to do something, he would go through and explain it all over again.”

The interactions women students had with community members, especially men, impacted their time in SBAE. Participants shared that men in the community often mansplained production agriculture concepts to them and sometimes took over their SAE projects. Ali shared this experience at county fair, “Half the time people would just take the goat from me and help do it for me instead of just like letting me struggle.” Erica described a similar experience with her steer project, “Even if like my steer something started to get a little bit out of hand like... other men would jump and be like, Are you ok? But that same response isn't the same with boys or guys.” Ximena described a time during her SAE project that it felt as though a community member assumed she was the assistant because she was a woman. She said, “He came over and he was like, ... ‘What are you doing here?’ I explained it. And then he was like, ‘Oh, are you his assistant?’ And I said, Why would you just assume I'm his assistant? We're *partners*.”

Peers themselves also engaged in gendered interactions. Erica discussed a time when a male student made a comment at an FFA event that made her feel unwelcome and self-conscious about her desire to become an agriculture teacher and FFA advisor. She said, "...the boy next to me said I, I just can't imagine having a woman advisor. I just don't think it would be fun, like it would not be fun to have a woman advisor." This quote in particular shows how even comments not made directly to students can have a profound effect on their experience in SBAE. Vera shared that overall, men students in her SBAE program were not welcoming to women students. She reflected, "I remember a lot of the men in FFA and my chapter just like that specifically were pretty toxic towards women." Beatriz explained that the men students in her agricultural mechanics classes teased her for being in that space. These gendered interactions shared by the participants occurred in all three components of SBAE, creating negative impacts and barriers for women students to navigate while learning.

Women Not Seen in the Same Spaces as Men Within the Agriculture Industry

Most of the participants discussed a lack of women representation in the agriculture industry as a whole, but specifically a lack of women in production agriculture roles. The participants reported seeing women primarily in roles that kept them inside an office or at a desk rather than in the field. Claire shared her experience, "So a lot of the women were like the farmer wives, and they helped a lot with like the money side of things." Hazel also had limited exposure to women in agricultural production-based positions, seeing women mostly in National FFA positions, Farm Bureau, and lobbyist positions. Ali explained that the lack of women representation in her community deterred her from her career goal of becoming a farmer.

The lack of diversity in women's roles did not necessarily keep women in the agriculture industry from impacting the participants. Penelope expressed, "...some of the most inspirational people to me in ag are females, but a lot of those people are also the people behind the desks and not in the fields." When the participants were able to have experiences with women involved in male dominated areas of agriculture it had a very positive and encouraging impact on their time in SBAE. Octavia described how seeing her older sister involved in agriculture made her excited that women choose to go into agriculture on their own, not just because they married someone involved in the agriculture industry. Octavia also had a positive experience with her woman CDE coach, which made a career in forestry more realistic for her to obtain. She said, She was such an example of a woman like kind of running everything. So, it didn't seem unattainable."

Some participants expressed that their FFA chapters were often more inclusive than the agriculture industry itself. So, once they actually entered the agriculture industry as adults, they were faced with discrimination, misogyny, and/or sexism that was not present in their SBAE program. Fatima described her experience when she began collegiate welding program:

FFA actually really set up an understanding for me that I could do any of this, and there was plenty of women doing it too. Then getting out of the program [SBAE] and just being in life and in college and seeing that it's not really like that actually.

It was really surprising, and honestly, really hard.

While the inclusivity present within SBAE from some participants was positive, it illustrates yet another challenge for women students once they leave SBAE and join the agriculture industry as young professionals or college students.

Discussion

The purpose of this study was to explore how the gendered substructure in SBAE affects the experiences of women SBAE students in Arizona with attention to the gendered substructure present in the classroom/laboratory, SAE, and FFA. The findings of this research are limited to the women that participated and their SBAE programs. All four components of the gendered substructure from Acker's (2012) theory of gendered organizations surfaced during interviews and were present in each theme that emerged during data analysis. While most of the participants reported that their overall time in SBAE was considered positive, the gendered substructure did cause negative experiences and prevented the participants from having all the same opportunities as men students in their SBAE programs.

Gendered enforcement of FFA official dress and differing expectations on appearance for women students arose as a major negative impact during the participants' time in SBAE. Past research has shown individuals that conform to cultural ideals of appearance, including societal ideas of how men and women should look, benefit from institutional advantages in the workplace (Kwan & Trautner, 2009). Participants who felt more comfortable in a skirt, pantyhose, heels, and makeup had an easier time participating in SBAE during activities that required FFA official dress. Participants who felt less comfortable experienced extra barriers to feel confident in official dress and also faced additional challenges to ensure their appearance fit the culture and expectations of their advisor and SBAE program. Even though the rules have changed to allow women students to wear slacks as a part of FFA official dress (National FFA, 2019), many SBAE teachers still had organizing processes in place explicitly requiring women students to wear a skirt and pantyhose. Research has also revealed that women are often held to additional expectations on their appearance that men do not experience in the workplace (Trautner & Kwan, 2010). This was also found with participants reporting that they were expected to follow rules for their appearance that are not a part of FFA official dress, such as wearing makeup or particular hair styles. This increases the amount of effort it takes for women students to participate in activities and also intensifies the advantages for those students that more easily fit the gendered expectations. Participants also expressed that these requirements for women students came with an extra financial burden; therefore, women students coming from more privileged economic backgrounds will more easily meet these expectations and reap the advantages of conforming to societal standards (Kwan & Trautner, 2009).

Based on the participant's experiences, not all aspects of SBAE have kept up with or changed to serve the increasing number of women students in SBAE. While prior research shows that women students are able to hold and succeed in FFA leadership roles (Ricketts et al., 2004); women were not given the same opportunities as their men counterparts to hold roles or complete tasks outside of the leadership realm. The inclusion of women students in agriculture mechanics and production agriculture roles remains limited. The lack of opportunities for women students to participate in these male dominated spaces can lead to a lack of learning opportunities. Job involvement, organizational commitment, and the work environment are major factors affecting pre-training self-efficacy and pre-training motivation (Tracey et al., 2001). SBAE is failing to create a work environment supportive to women students, commit as an organization to show women that they are welcomed in all spaces, and highlight women involvement in agriculture mechanics and production careers. Therefore, even if women students

are given the space to participate in agricultural mechanics and production agriculture through SBAE, they will not fully achieve all learning outcomes (Tracey et al., 2001). Participants felt that they were not given the opportunity to demonstrate their physical abilities, felt they did not have the physical abilities required for a task, or were singled out when they did demonstrate strength. All which negatively impacted the work environment, organizational commitment, and their feeling of belonging, leading to fewer opportunities to obtain new technical skills.

The under representation of women in the agriculture industry (Fremstad & Paul, 2020) was clearly seen by the participants and was a reason that some participants changed their career plans. It has been observed that the relegation of women in the agriculture industry to “bookkeeping” and “farm wife” roles has made women feel uncomfortable in the agriculture industry and in non-traditional agricultural education settings (Trauger et al., 2008). This lack of representation also caused the participants in this study to feel unwelcome in those settings. The representation of women in SBAE classrooms and the agriculture industry affected the participant’s experiences and showed that the gendered structure in SBAE and the agriculture industry are complexly intertwined. It is still unclear whether the agriculture industry or SBAE is the main factor driving the gendered representation of women. Some of the gendered trends in the agriculture industry were also seen in the participants’ SAE projects. One trend mirrored in the participants’ experiences was the tendency for men to take on more physically demanding and production agriculture roles. Another trend was the expectation that men raise large livestock species while women are relegated to small livestock species (Fremstad & Paul, 2020; Trauger et al., 2008). This illustrates that SBAE has not expanded the participants’ horizons in the agriculture industry; rather, it has reinforced the gendered trends seen in the agriculture industry.

Since SBAE in Arizona has a higher number of men teachers than general education (Bennet et al., 2020) and SBAE teachers perpetuate the culture of SBAE, it is possible that this gender ratio and influence over program culture is leading to systemically gendered managerial power and organizing processes in SBAE. The ratio of men to women SBAE teachers in Arizona may also allow for the possibility of more unexamined gender beliefs to affect the organizational culture. The experiences of the participants also match what has been observed at the collegiate level in prior research. In Oklahoma female students faced discrimination from their male peers and from supervising practitioners during student teaching (Kelsey, 2006). Women in agricultural education and Extension education graduate programs experienced “living in a man’s world”, “the Good Ol’ Boys Club”, microaggressions, and questioning of their and other women’s competency (Cline et al., 2020). The finding of this study show that these gendered experiences do not begin at the collegiate level but may also be present at the secondary level.

Although Kite (2001) wrote that youths’ pressure to conform usually lessens as they move through adolescence, this research found that during their time in SBAE the participants faced more pressure to conform to how the agriculture industry sees women. Many women students were motivated to work hard and pursue new opportunities by this pressure to conform. While the participants noted that fighting against the pressure to conform and fighting against stereotypes was part of what caused them to achieve success in SBAE, the participants did not see this same pressure applied to men students. Although the pressure to conform may appear to be helpful for women students in this study, it is important to note that women students should not be subjected to negative motivation that tries to make them conform solely because they

identify as a woman. While prior research in two Missouri SBAE programs found that students there had different perceptions on how individuals of different genders should act as leaders (Kagay et al., 2015), most of the women in this study did not share this sentiment. The participants reported that most of the perceptions on leadership between genders came from SBAE teachers, community members, and a lesser amount from men peers.

The participants in this study came from SBAE programs with a single teacher, multiple teachers, men teachers, women teachers, and both men and women teachers. The participants also came from programs located in urban, suburban, and rural areas. Based on the findings, these differences between SBAE programs did not affect how the gendered substructure within SBAE impacted the participants' experiences. This lack of difference in experiences between programs showed that the gendered substructure can persist no matter the gender of teachers, number of teachers, or location of the SBAE program.

Recommendations for Future Practice and Research

SBAE teachers hold most of the managerial power at the local level and perpetuate the culture of SBAE. Therefore, they have the opportunity to make a significant impact on their students through creating inclusive spaces in the classroom, FFA, and SAE that are supportive, welcoming of all students, and do not perpetuate gendered aspects of SBAE culture. I recommend that teachers continually reevaluate their personal biases and unexamined gender beliefs to ensure that they are not reinforcing gender stereotypes or gendered SBAE culture in their programs. One recommended practice is to assign tasks equally between men and women students. This research discovered that more physical, mechanical, and production agriculture roles were assigned to men students by teachers. A more equitable distribution of roles can be achieved by encouraging students to pursue roles, and assigning students to roles, based on the student's interests and skills. This includes gendered assignment of officer roles within the officer election process. Common gendered trends in officer roles seen in this study were assigning women students to the secretary and reporter positions. SBAE teachers should also educate all individuals involved in the officer selection process of these trends. In addition to assigning officer roles, SBAE teachers must also carefully monitor student interactions to avoid gender bias. Of course, overtly sexist, misogynistic, or otherwise offensive comments should not be said, but due to unexamined gender beliefs, even a comment that is made with good intentions can cause women students to feel unwelcome or alienated. Praise and criticism should be given to men and women students for the same reasons and in the same manner. Additionally, praise or criticism should not be given to women students just because of their gender. I also recommend SBAE teachers do not set different expectations for women and men students within FFA, leadership, and classroom activities based on gender.

Gendered enforcement of FFA official dress was also an issue faced by the participants. I recommend SBAE teachers, state FFA staff, and National FFA staff fully embrace and encourage the updated FFA official dress rules allowing any student to wear slacks or a skirt, a tie or scarf, and any closed toed black dress shoes (National FFA Organization, 2019). Requiring women students to wear skirts, pantyhose, and heels can cause discomfort, insecurity, physical pain, and lack of ability to physically participate in all activities. Participants in this study changed what activities they participated in, participated in less activities, or had negative

experiences during FFA activities due to official dress requirements. Therefore, it is especially important that all FFA advisors and FFA state staff not only allow, but welcome students to wear the components of FFA official dress in which they feel most comfortable. State and National FFA staff can facilitate this culture shift by encouraging all State and National FFA Officers to wear slacks or a skirt at any FFA event, as these individuals serve as role models to the membership. I also recommend that FFA advisors do not place expectations on their students' appearance beyond the rules of FFA official dress. Whether explicitly or implicitly, women students should not be expected to wear makeup, a specific hair style, or heels.

SBAE teachers not only perpetuate the culture of SBAE in their program but are also many students' first introduction to SBAE and the agriculture industry. With this responsibility, SBAE teachers can introduce students to an industry and organization where all students see a place for themselves to belong. I recommend SBAE teachers express that all students have the opportunity to succeed and utilize women in images, videos, and examples when teaching students. It is not enough just to show women in agriculture; women should be shown specifically in production agriculture and mechanics roles. These are the roles that participants reported seeing women in the least and some participants did not report seeing women at all in mechanics or production-based agriculture roles. Diverse representation of women should also be the responsibility of state FFA associations and The National FFA Organization.

SBAE teachers must also decide carefully what community members they bring into their programs. First, to make sure that the individuals they invite into their programs are supportive of all students and do not reinforce gendered aspects of SBAE. Second, to ensure they are presenting a representative and inclusive picture of the agriculture industry. If every woman from the agriculture industry that interacts with the SBAE program is in a non-production agriculture role then it presents the picture that women belong in those roles. Lastly, I recommend that grassroots efforts be made in SBAE teacher communities and SBAE teacher associations to better educate SBAE teachers of these issues. If teachers are not first made aware of the gender biases and inequities present in SBAE, then enacting change will not be possible. Grassroots education efforts must also teach SBAE teachers how they can dismantle and avoid gendered biases and inequities in their own SBAE programs in order to better serve all of their students.

There is a lack of research on women students' experiences in SBAE; therefore, my first research recommendation is to expand the exploration of women's experiences in SBAE. By better understanding the experience of all students, it becomes possible to create a more positive and equitable learning environment. Some participants acknowledged their privilege during interviews, identifying as straight and cis gendered women. There is a paucity of research on the experiences of individuals who do not identify as cis gendered in SBAE. Due to the differing expectations that existed between women and men students observed in this study, further research should also investigate whether the higher expectations of women students in leadership and FFA activities are leading to the increased participation of women students and decreased participation of men students in leadership roles in SBAE. Researchers should also explore if the lower expectations of women students in agricultural mechanics and production agriculture activities is driving the decreased number of women students involved in those activities. Finally, any women students who decided to leave SBAE before their senior year of high school were not included in the research due to the research parameters. Therefore, I recommend that a

follow-up study is conducted to explore the experiences of women students that have left SBAE programs early, so their experiences can be better understood.

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Gender Representation and Re-Alignment in Agricultural Education: A Historical Analysis of Structural and Cultural Changes

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Abstract

Changes within and outside of agricultural education were analyzed between 2009-2014 which coincided with a reduction of male pre-service agricultural teachers. Under the lens of the Theory of Gender Re-alignment, special attention was given to changes in legislation, curriculum, recruitment, and economic factors which relate to structural and cultural changes within agricultural education. The changes identified in this study explain why male students are being outperformed by female students at a two-to-one ratio regarding agricultural education degrees obtained.

Introduction and Literature Review

From the times of the ancient Greeks, through the beginning of the industrial revolution, teachers were predominantly male and taught aristocratic male students (Houston, 2009). Public schools throughout early history were extremely male dominated, with minimal inclusion of female individuals in traditional education settings. If women were to obtain an education, it was often through private lessons within the home (Houston, 2009). Today education has shifted to be comprised of over 76% female teachers in public schools (NCES, 2022). This change occurred over the last 150 years and began with the creation of the common school in the early 1800s (Sedlak & Schlossman, 1986).

The common school of the 1800s was designed to reach a larger population of students in the United States and thus increased the demand for quality teachers (Sedlak & Schlossman, 1986). Female individuals were often heavily recruited to be teachers as they were stereotypically more nurturing and society deemed it acceptable to pay women less than men (Kollmayer et al., 2018; Sedlak & Schlossman, 1986). Discriminatory and sexist systems in society restricted opportunities for women to enter the workforce during the nineteenth century, which resulted in many women seeking out the teaching profession (Houston, 2009). Although women were encouraged to be teachers, men still held power in educational institutions as they still controlled higher-paying educational administration roles (Houston, 2009; Lyon & Saario, 1973).

Given the prevalence of sexist recruitment of women toward teaching roles, men are still not effectively recruited into the classroom (Carney, 2016; Kollmayer et al., 2018; Sedlak & Schlossman, 1986). The prominence of females rooted in sexist ideologies has been cited to insight gender role divides and perpetuates gender stereotypes (Carney, 2016; Kollmayer et al., 2018). Ingersoll et al. (2014) state if the current recruitment trend of female teachers continues, there will be a 4:1 ratio of female to male teachers in this country.

Researchers have noted women are also attracted to the career due to the structure and potential for family and work balance (Ingersoll et al., 2014), while men are deterred from teaching due to a lack of a defined career ladder and lower pay compared to other professions (Sedlak & Schlossman, 1986). Education has long underpaid teachers and underfunded classrooms in comparison to other professional careers, further creating challenges for recruiting men into a non-gender-typical role (Ingersoll & Smith, 2003). Recent efforts have been made to increase incentives to attract males into the teaching profession, but salaries and professional support are still lacking in American public education (Ingersoll & Smith, 2003).

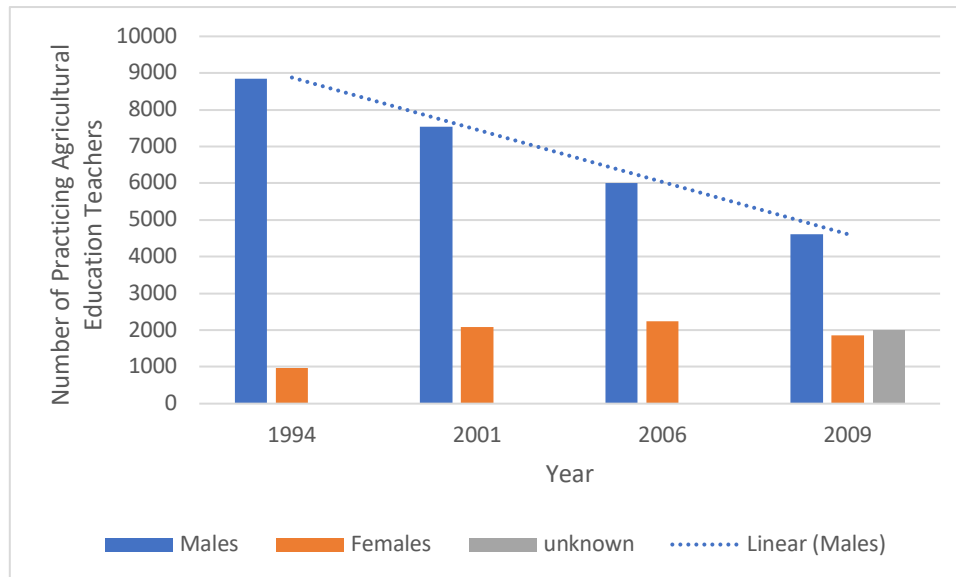
Career and Technical Education (CTE) in the United States has followed a different trajectory in comparison to the entire education system. The earliest stages of CTE took the form of apprenticeships which were extremely male dominated (Gordon, 2014). Even throughout the nineteenth century and the start of the industrial revolution, CTE was led by men who *only* taught male students. The passing of the Smith Hughes Act in 1917 further generated gender stereotypes and created two distinct tracks a student would fall into depending upon their sex. For male students, the Smith Hughes Act helped fund school-based agricultural education (SBAE), and for female students, it provided funding for home economics classes (now commonly referred to as Family and Consumer Sciences [FCS]). The establishment of these gender-based pathways furthered the stereotype that men worked and made the household income, while women were meant to stay in the home (Gordon, 2014).

Women began to gain agency in education through the Equal Pay Act of 1963, seeking to close pay wage gaps between the sexes. Soon after the Equal Pay Act was signed, the Civil Rights Act of 1964 was passed which expanded protections against discrimination based on race and ethnicity. Unfortunately, gendered stereotyping and discrimination in CTE remained unsanctioned until the passing of Title IX in 1972 that deemed gender discrimination in educational activities funded by the federal government illegal (Patsy Mink Equal Opportunity in Education Act, 1972). Title IX protections created equitable access to CTE programming for students and teachers of all genders (Patsy Mink Equal Opportunity in Education Act, 1972). Furthermore, the passing of the Carl D. Perkins Vocational Education Act (1984) allotted federal funding to promote gender equality in CTE. However, even after the passing of such liberating legislative acts, females are still largely underrepresented in many of the traditionally male dominated CTE pathways (Toglia, 2013). This finding can be attributed to the notion that male dominated CTE pathways were not created with consideration of females, therefore women are unable to truly be liberated in a space not originally created for them and may be apprehensive about joining these pathways.

Under the umbrella of CTE, SBAE trends appear to have similarities with both CTE and the entire public education system. Agricultural education as we know it today stemmed from the passing of the Smith Hughes Act in 1917 (Gordon, 2014). This put SBAE on the trajectory of male domination and female exclusion. Following legislation demanding equitable inclusion of women in educational spaces (Patsy Mink Equal Opportunity in Education Act, 1972) and the workforce (Equal Pay Act, 1963; Civil Rights Act, 1964), the National FFA Organization voted to allow female students to hold membership in 1969 (National FFA Organization, 2022). Since this historic vote, the percentage of female students and teachers has largely increased throughout SBAE. However, the ratio of male to female teachers in agricultural education still

reflects a male dominant field. The ratio of male to female practicing agricultural education teachers was 2:1 male to female as of 2009 (Kantrovich, 2010), prior to the gap in the National Agricultural Education Supply & Demand Study. This trend is shown in Figure 1.

Figure 1
Practicing Agricultural Education Teachers by Gender 1994-2009

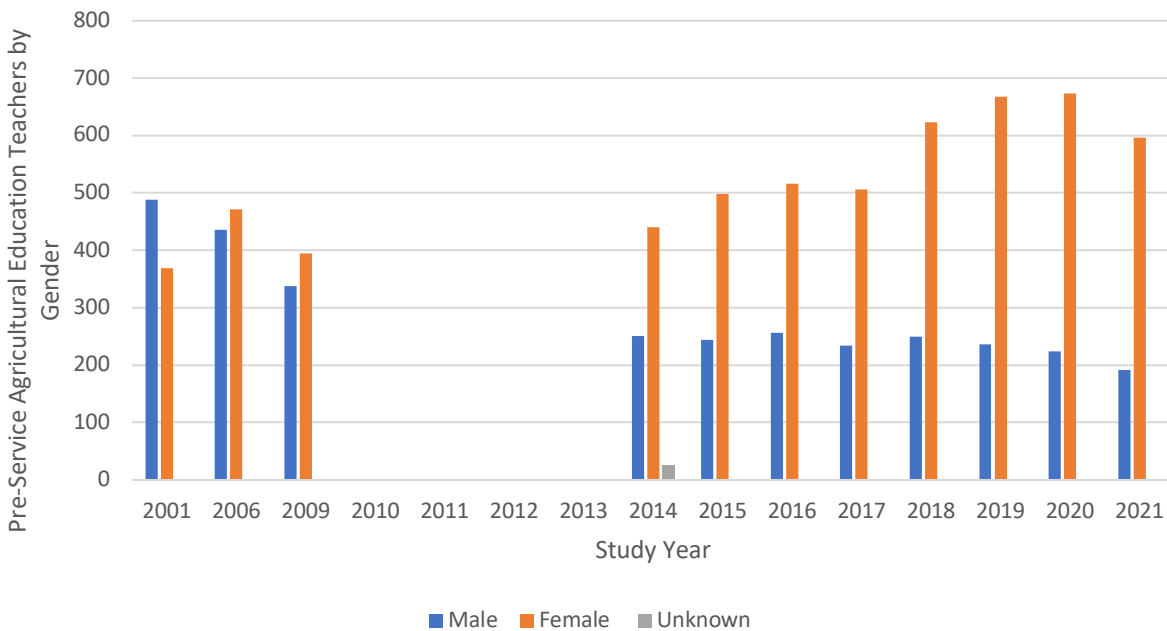


Note. Chart represents data from reports of the National Agricultural Education Supply and Demand Study (Camp et al., 2002, Kantrovich, 2007, Kantrovich, 2010).

Looking to the future, SBAE appears to be growing in gender equity and garnering more female representation. As of 2021, the ratio of female to male undergraduate students seeking certification in agricultural science was 3:1 female to male (Smith et al., 2022). Although the ratio of practicing agricultural teachers did not represent gender equality within the profession historically (Kantrovich, 2010), the ratio of newly certified teachers in SBAE has shifted the trend in the opposite direction. This shift in gender demographics of SBAE teachers reflects the trends of the education system holistically (NCES, 2022). Supply and demand data of agricultural educators shows that pre-service gender ratios have flipped between the years of 2001 to 2021 (Camp et al., 2002; Smith et al., 2022). Pre-service agricultural educator data shows that females broke the 50% barrier between 2001 and 2006 and ratios of females to males remained nearly 1:1 through 2009 (Camp et al., 2002; Kantrovich, 2007; Kantrovich, 2010). However, data from recent years shows female enrollment in teacher preparation programs has increased and male enrollment has decreased, as shown in Figure 2.

Figure 2

Pre-Service Agricultural Education Teachers by Gender 2001-2021



Note. The chart represents data from reports of the National Agricultural Education Supply and Demand Study (Camp et al., 2002; Kantrovich, 2007, 2010; Foster et al., 2015, 2016, 2020, 2021; Smith et al., 2017, 2018, 2019, 2022).

The National Agricultural Education Supply & Demand Study was not published between 2009-2014 when the ratio of male to female pre-service teachers shifted to 2:1 female to male, and later 3:1 female to male. This study aims to determine pivotal events in history that have led to the current gender trends in SBAE and to analyze events from unreported years of the supply and demand study.

Conceptual and Theoretical Framework

The concept of the gender gap is a frequently cited phrase found in many different disciplines (Legewie & DiPrete, 2012). Due to the wide use of the term, it is difficult to narrow it down to one standard definition as it changes from discipline to discipline. However, the gender gap is typically assigned to label measurable differences between males and females regarding achievement, ideologies, or behaviors (Legewie & DiPrete, 2012). In educational studies, the term gender gap often refers to academic achievement differences between males and females (Buchmann et al., 2008; Esteve et al., 2012).

Reaching outside the parameters of education, the political science field has conducted many studies on the reversals, or changes, in gender-specific behavior (Abramowitz & Saunders, 1998; Campbell, 2002; Inglehart, 1997; Kaufmann, 2002; Norris, 1999). Many of these studies refer to the change in political ideology by gender as a *realignment*. Most of the findings within these

studies cite changes between generational cohorts and changes within the voting culture over time as reasons for the reversal of gender-based voting (Abramowitz & Saunders, 1998; Campbell, 2002; Inglehart, 1997; Kaufmann, 2002; Norris, 1999). These various concepts have since been combined to generate the Theory of Gender Re-Alignment (TGRA; Inglehart & Norris, 2000).

The TGRA stems from an initial study which analyzed a gender gap among voters in the United States (Inglehart & Norris, 2000). Their study showed females had changed their voting habits in post-industrialized society from conservative to liberal tendencies. From this, the authors proposed the TGRA to explain the anticipated change in sex roles and reversal in gender-based voting habits. The TGRA outlines three reasons for the re-alignment of gender-based values: (a) level of political and economic development, (b) effects of generational cohorts, and (c) structural and cultural changes (Inglehart & Norris, 2000).

Inglehart and Norris (2000) describe many western nations had progressed further economically, allowing for a change in job markets and opportunities for both sexes to join the labor force. This advancement past traditional gender roles has allowed females to develop an interest in different political views that align more towards their advantage. Societal development led to younger female generations aligning with more liberal, feminist views as opposed to the conservative views of the older generations. Further, as structural changes occur, such as opportunities for females in the labor force, so does culture. Educational institutions are also impacted by structural and cultural changes, with more availability of post-secondary institutions for females creating new professional opportunities aside from traditional feminine roles (Inglehart & Norris, 2000). TGRA allows for an explanation of how structural and cultural changes in society and education are reflected in SBAE. Identifying changes in structural and cultural components could help explain the decline in male pre-service agricultural teachers.

Purpose and Objectives

To address the decline in pre-service male agricultural educators, this scholarship was guided by three overarching research objectives: (1) identify structural and cultural changes in Agricultural Education between 2009-2014, (2) identify structural and cultural changes outside of Agricultural Education between 2009-2014, and (3) describe how these events could have played a role in the decrease of male pre-service agricultural educators.

Methodology

This study used qualitative historical research methods to advance the research objectives (Borg & Gall, 1983). As historical documents are collected, primary and secondary sources were used to gather data pertaining to the research questions. Primary sources of data for this study included articles published in the *Agricultural Education Magazine* and the *Journal of Agricultural Education*, research agendas of the American Association for Agricultural Education, communication documents within the National Association of Agricultural Educators, and policy documents of the National FFA Organization. Secondary sources included various documented means of communication such as newspaper articles and books pertaining to the research question as a method of filling in the gaps left by the primary sources.

Validity and Reliability

The validity of the data collected was analyzed to ensure credible and authentic information is used. Data collected in this study were subjected to external criticism as well as triangulation. The use of external criticism allowed the researcher to select both appropriate and quality documents that advanced the research. In addition to external criticism, the researchers followed principles of triangulation via the use of various sources of data to produce trustworthy findings and results (Creswell, 2014). Finally, peer debriefing of documents by social science and agricultural education scholars was utilized to clarify themes and findings within the study (Creswell, 2014). After ensuring the validity and reliability of the data collected, data was coded to identify the major themes emerging from the historical data.

Data Collection and Analysis

The study analyzed the changes in agricultural education and public education between the years 2009 through 2014 due to a lack of supply and demand census data. Due to the lack of census data, the study examined documents during this period to evaluate structural and cultural changes in education. Documents outside of the five-year span were considered to better explain the starting characteristics of both agricultural education and public education but were not considered in answering the research questions. However, it is likely for an article published between 2009- 2014 to contain data that predates this qualification due to potentially lengthy research and publication processes. Yet, the published article was used due to its contributions to the scholarly conversation of the time.

Articles from the *Journal of Agricultural Education* (JAE) and the *Agricultural Education Magazine* (AEM) were utilized to answer research objective one. Articles were organized chronologically by source and read to determine the validity and reliability of the document. Governmental publications and other published documents were gathered to serve as secondary sources. The same process was repeated to answer the second research objective while utilizing a broader scope of primary sources. Findings related to structural and cultural changes were referenced to the TGRA (Inglehart & Norris, 2000) to answer research objective three.

Findings

The findings in this study are broken down into the research objectives (e.g., changes in agricultural education between 2009-2014 and changes outside of agricultural education between 2009-2014). Each objective has several themes to best depict findings in relation to the research questions.

Research Objective 1: Changes in Agricultural Education Between 2009-2014

Three themes were identified to help depict changes within agricultural education that led to demographic shifts in pre-service agricultural educators.

Changes in Legislation Pertaining to Agricultural Education

Considering the wide array of legislation passed during this five-year span, only changes brought forth by the federal government that impacted SBAE were analyzed. To best comprehend the legislative scope of this study, the parameters were expanded to discuss the implications of the No Child Left Behind (NCLB) Act of 2001. The NCLB act was an educational reform focused on improving the quality of education every student received through increased accountability of schools and teachers. This increased standardized testing and remained in place federally until the passing of Every Student Succeeds Act (ESSA) of 2015. Although the passing of ESSA is also outside of the study parameters, it was likely lobbied for during the study timeframe, indicating a changing climate of education nationally. Again, on the cusp of the study's parameters, in 2008 Congress extended the Higher Education Act of 1965 through the Higher Education Opportunity Act (2008) which continued funding for post-secondary education through 2015. This act increased financial resources for post-secondary students with the intention of increasing university enrollment. President Obama signed into law the American Reinvestment and Recovery Act (ARRA) of 2009 to jump-start the nation's economy and spare educational funding from national budget cuts.

Specific legislation in CTE is largely influenced by the renewal of the Perkins Act in 2013 (ACTE, 2017). The revisions to the Perkins Act included more stress towards rigor and relevance of CTE programming through (a) alignment of standards and curriculum, (b) collaboration with industry professionals, (c) creation of accountability measures, and (d) the promotion of innovation (ACTE, 2017). Agricultural education thus began to follow guidance from national legislation and created the first national Agriculture, Food, and Natural Resources (AFNR) standards (The Council, 2015). Although the creation of national AFNR standards is not specifically legislatively based, it does provide the connection between educational legislation and the SBAE curriculum.

Changes in Agricultural Education Curriculum

To identify changes in the curriculum within SBAE, this study examined articles in the *Journal of Agricultural Education* (JAE) and *Agricultural Education Magazine* (AEM). These two periodicals provided adequate data to analyze as they serve as a "conversation block" for both researching teacher educators and educational practitioners. From JAE artifacts, it is apparent the curriculum at both secondary and post-secondary levels has changed. The creation of AFNR standards prompted calls for an updated science-integrated curriculum in SBAE (French & Balschweid, 2009; Myers et al., 2009; Theriot & Kortlik, 2009) and an increase in science coursework in teacher preparation programs (Washburn & Myers, 2010). However, Saucier and McKim (2011) cautioned about this new alignment of science standards in agricultural mechanics curriculum. JAE findings also called for more preparation for teaching students with disabilities (Pense et al., 2010; Stair, 2010) and accommodating curricula for the needs of marginalized teachers and students (King et al., 2013).

Issues of AEM during this timeframe show calls for curriculum changes as well. Pentony (2009) further discussed the new national standards for SBAE and solidified that curriculum is changing to align to these standards. Authors in AEM also discussed the need for new assessments,

technology, and facilities (e.g., bench laboratory space) to align with the changing standards (Anderson, 2014; Clark et al., 2011; Collins, 2014; Emig, 2014; Fowler et al., 2014; Gratz, 2009; Thoron, 2014; Wells, 2014; Womochil, 2009). It should be noted the calls from AEM and JAE both appear to be reactionary following the changes in legislation. Because of this, the change in agricultural education curriculum represents a structural change that may have pushed male students at the secondary and post-secondary levels out of agricultural education programs.

Changes in Agricultural Education Recruitment

Several JAE articles were closely related to the discussion of the recruitment of future SBAE teachers. Most of the recruitment literature has focused on determining when and why students decide they want to teach (Lawver & Torres, 2011; Roberts et al., 2009a, 2009b). Additional scholarship identifies several external factors (e.g., defined career ladder, fair salaries, advancement opportunities, and extended contracts) help increase individuals applying to pre-service programs and teaching positions (Arnold & Place, 2010; Warnick et al., 2010). Later in the study parameters, findings suggest a shift in recruitment with calls for more recruitment of female and minority teachers and students in SBAE (Altman, 2010; Vincent et al., 2012). Lastly, recruitment strategies have shifted focus toward the influence of secondary agricultural education teachers on first-generation college student's academic success (Irlbeck et al., 2014). These changes in agricultural education teacher recruitment highlight cultural changes within the profession that could have led to a gender imbalance if the newer recruitment strategies were more appealing to prospective female students.

Like the findings in the curriculum, the recruitment-based findings from the AEM run seemingly parallel with those found in the JAE. However, it is observed the progression from identified recruitment problem to a solution was accelerated in the AEM. It is assumed this is in part due to the nature, style, and audience of the AEM compared to JAE as it is geared toward practicing secondary teachers. Findings from AEM related to recruitment included: (1) future teachers in SBAE will likely be different than those currently teaching (Disberger, 2009; Vincent & Board, 2009; Washburn & Warner, 2009), (2) agriculture teachers should be involved in the recruitment process (Buckley, 2009; De Lay, 2009; Jimenez, 2009), and (3) calls for changes in the pre-service agricultural education program to better address needs of students and prepare them for the changing career field (Bellah, 2011). Unfortunately, due to the themed nature of the AEM, volumes or articles discussing recruitment efforts are not substantially found again within the research parameters of 2009-2014. However, these changes found in the AEM do reflect cultural changes within the agricultural education profession which could insight into a gender imbalance if the new recruitment techniques were more welcomed by female students.

Research Objective 2: Changes Outside of Agricultural Education Between 2009-2014

Four themes were identified related to the second research objective to describe changes outside of agricultural education that contributed to demographic changes.

Major United States and World Events

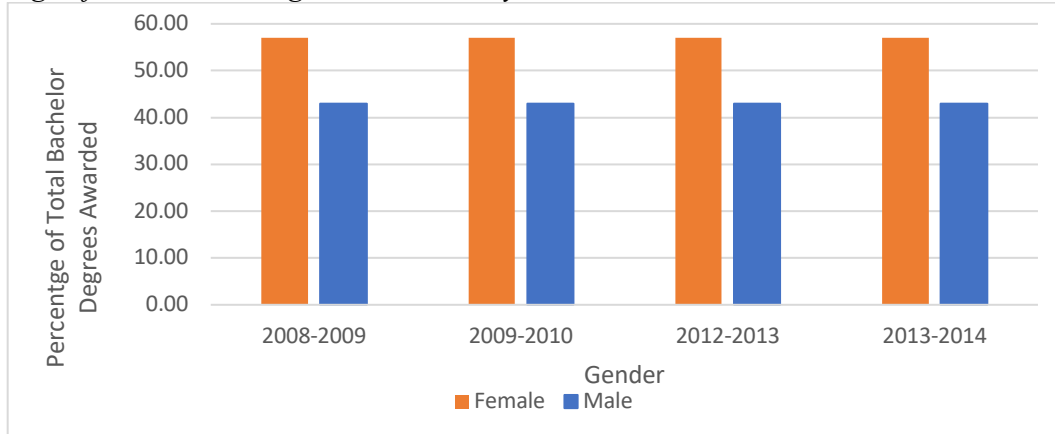
Although it is not an all-encompassing list of national and world events, selected events were chosen to both recap the era and highlight events involving the U.S. economy, and political and global landscapes. Much like the legislative discussion earlier in the findings, this study extended beyond the starting date due to the carry-over effect of the first event which was the Global Financial Crisis of 2008, better known as the burst of the housing bubble (Erkens et al., 2012). While this did occur before the study's start date of 2009, the implications and economic effects remained in place for much of the study's duration.

Barack Obama was elected as the first African American President of the United States in 2008 and served in office throughout the duration of the study parameters (Bligh & Kohles, 2009; Jacobson, 2010). During this time, the Democratic Party had much of the political control in Washington and led a more progressive agenda guiding our nation at the time (Erkens et al., 2012). Shortly after taking office in 2009, to counterbalance the negative economic factors inherited from the previous administration, President Obama signed a Stimulus Package (ARRA) aimed to help rebound the United States' economy. However, in addition to educational provisions, the ARRA also provided many financial and tax-based initiatives to help soften the current economic hardships. Later viewed as a hallmark of his administration, President Obama signed into law the Patient Protection and Affordable Care Act in 2010 which had many effects on both employees and employers. Running parallel with the economic woes facing the United States, ongoing military conflicts were still present in the Middle East during this time (Compton, 2011). The national climate of the United States during the timeline of the study centered around civil rights via race, gender, and sexual orientation (Baude, 2013). A prime example of this was the U.S. Supreme Court's decision in 2013 to strike the Defense of Marriage Act which did not recognize the legitimacy of same-sex marriages (Baude, 2013).

United States Educational Attainment

The enrollment and expected graduation rate fluctuated between the 2008-2009 and the 2013-2014 academic years (Snyder & Dillow, 2010, 2011, 2012, 2013, 2015; Snyder et al, 2009, 2016a, 2016b). Additionally, high school dropout rates decreased during the timeframe and there were large increases in the number of post-secondary degrees awarded. Focusing on the gender differences of those obtaining a bachelor's degree, it was found in comparison to past decades males had a larger increase of bachelor's degrees obtained, but females still outranked males in current bachelor's degree obtainment at 57% female to 43% male (Snyder & Dillow, 2010, 2011, 2012, 2013, 2015; Snyder et al, 2009, 2016a, 2016b) as seen in Figure 4.

Figure 4
Percentage of Bachelor's Degrees Awarded by Gender



Note. Adapted from Snyder & Dillow, 2010, 2011, 2012, 2013, 2015 and Snyder et al., 2009, 2016a, 2016b.

Agricultural Economics

When considering the lack of male pre-service agricultural teachers, broad scale U.S. agricultural economics were also noted. U.S. agricultural commodity prices rose across the board during the study years of 2009- 2014 (U.S. Department of Agriculture, 2017a, 2017b, 2017c). This increase of crop prices, followed by a rise in livestock prices towards the end of the study time frame, possibly created more financial stability in traditional agricultural production (U.S. Department of Agriculture, 2017a, 2017b, 2017c). Because of this, it is possible young men decided to stay on the farm or chose a different degree path due to the possibility of financial prosperity in agricultural production. However, agricultural commodity prices have since leveled out and these effects on pre-service agricultural teachers have yet to be determined.

Industry and Rural Demographics

Females comprised nearly 47% of the total labor force and males made up the remaining 53% during the study timeframe (U.S. Department of Labor, 2010, 2011, 2012, 2014a, 2014b). Contrary to the entire distribution of the workforce, it was found females make up 52 percent of management and professional level jobs and this remained constant over the study years (U.S. Department of Labor, 2010, 2014b). Rural laborers on average are older and receive less pay than a similar laborer in an urban setting (Day et al., 2016; Wang & Findeis, 2004). These economic gaps between rural and urban laborers are often more profound for women due to an increased gender wage gap with less job opportunities available (Wang & Findeis, 2004). However, a career as an agricultural educator in a rural community could offer financial stability and family flexibility which may be more attractive to females in such areas.

Education Employment Salaries

The concluding theme of the second objective sought to identify the salaries of public educators in the United States. The public teacher salary data showed slight annual increases over the study time frame starting with an average salary of \$53,910 in the 2008-2009 school year and ending at

\$56,689 in the 2014-2015 school year (Snyder et al., 2016a, 2016b; Snyder & Dillow, 2009). It should be noted these dollar amounts represent the raw dollar figure per year and do not account for inflation. However, it was stated in the data that education salaries of this time were nearly two percent lower than those of in previous decades (Snyder et al., 2016b).

Conclusions, Implications, and Recommendations

To achieve research objective one, this study identified accountability, curriculum, and recruitment changes that occurred in agricultural education between 2009-2014. Accountability factors were typically measured via standardized testing. In response to legislative changes, CTE and SBAE created national standards to better meet accountability needs. This legislative push and creation of standards also fueled curriculum changes within agricultural education that switched from more traditional agricultural production practices to more integration with science phenomena. Running parallel with the changes in legislation and curriculum, agricultural education leaders also began addressing the deficit of agricultural teachers entering the profession annually. It was found in this study recruitment efforts of future agricultural teachers changed from broad terms of recruiting traditional agricultural students to become more personalized in the recruitment of a more diverse future teacher population.

Additionally, this study identified changes outside of agricultural education from 2009–2014 to describe research objective two. During this time, the United States endured one of the worst economic collapses since the Great Depression. The U.S. was led by a primarily democratic-controlled national government that passed several acts impacting educational institutions and pushed for liberal societal change. It was also found educational attainment of U.S. citizens grew steadily over the years in question and females received most bachelor's degrees annually. After analyzing the labor force by gender, males still dominate the entire working population, but females occupy over half of the professional and higher-level positions across the country. Educational salaries were analyzed and found to remain nearly constant throughout the duration of the study years. These changes both within and outside of agricultural education within the study timeframe highlight structural and cultural changes that could have led to a reduction in the number of male pre-service teachers.

The third research objective sought to describe how these events could have played a role in the decrease of male pre-service educators. The TGRA provides a lens of which to analyze the gender change in pre-service agricultural educators (Inglehart & Norris, 2000). The TGRA outlines three factors leading to a “re-aligning” of gender specific rolls which include political and economic development, generational cohorts, and structural and cultural changes (Inglehart & Norris, 2000). Although arguments could be made for all three of these factors, this study specifically analyzed the structural and cultural changes both within and outside of agricultural education to better understand the change in gender-based participation.

From our findings, it is apparent agricultural education did experience both structural and cultural changes throughout the years analyzed. These structural and cultural changes in the agricultural education curriculum appeared to be a reactionary response to the changes in legislation as opposed to a proactive approach. New legislation led to the inclusion of females in CTE and SBAE programs and prompted a change in standards and curriculum for SBAE

programs. It is possible this structural change of legislation and curriculum could have led to gender re-alignment within agricultural education if more female students were apt to succeed in such an environment.

Furthermore, agricultural education experienced cultural changes regarding recruitment. Recruitment efforts in SBAE changed from the broad recruitment of traditional agriculture students to individualized recruitment efforts which targeted a more diverse population. Because of this, both the culture of recruitment and the cultures being recruited for agricultural education changed. This cultural change in agricultural recruitment efforts could have added to the gender re-alignment of the field where females were more apt to enroll in pre-service agricultural education programs.

Even more difficult for females, a career as an agricultural educator may be a stable choice for career and family-minded rural women. Because of this, it is possible the overall economic benefit of teaching agriculture is higher for females than males and has contributed to the gender imbalance in pre-service agricultural educators. The average public education salary should also be considered when analyzing the structural changes outside of agricultural education. After a small initial increase in the average teaching salary, it remained to stagnate throughout the duration of the study. Coupled with the effects of the financial crisis, this could have also re-aligned gender roles and driven males away who were expecting to receive higher levels of pay.

Being descriptive by nature, this study identified specific changes within agricultural education that run parallel with the reduction in male pre-service agricultural teachers. It did not, however, specifically test the effect each factor had on gender specific involvement. Because of this, the study is left with several questions that should further be investigated by future researchers. First, future research should identify where the male population of pre-service agricultural teachers has migrated to. Although this study analyzed different aspects of agricultural education and U.S. educational attainment in general, it did not identify where these individuals have gone. It is unclear if more males have left agricultural education to pursue other agricultural professions if they have migrated more towards industry and trade careers, or if they have voided higher education all together. Additional research should also analyze why the migrated males have chosen to leave or not enter the agricultural education field. Using quantitative and qualitative methods, researchers should analyze and arrange the effect the changes in legislation, curriculum, and recruitment, in addition to the external factors, by order of which they had the most effect on potential male's decision to enter the field.

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Utilizing Framing Theory to Construct a Typology of Farm to School in Georgia

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Utilizing Framing Theory to Construct a Typology of Farm to School in Georgia

Farm to School is an experiential learning approach for educating children about agriculture and the environment. In Georgia, Georgia Organics is usually credited with formalizing Farm to School, but other organizations have long taught farm to school concepts. Accordingly, framing theory was used to explore how key players communicate about Farm to School in Georgia. Respondent-driven sampling was used to recruit participants, and twelve total individuals participated. Narrative analysis was employed because it can be used to examine data presented in storied forms. Six issues frames were constructed; briefly, background experiences; issue of child nutrition; rise of the Georgia Farm to School Alliance; issue of ownership and language; COVID-19's impact on the food system; and reimagination of Farm to School. Practitioners of Farm to School should evaluate whether these messages align with their current missions. Future research should discern whether Farm to School programs and farm to school practices differ. For example, participants highlighted it was not them running the programs but their educators, yet when asked who could shed light on Farm to School in Georgia, championing educators were not mentioned, rather notable Farm to School-based organizations.

Introduction

Farm to School is an experiential learning approach for educating children about agriculture, food, nutrition, and the environment (National Farm to School Network, 2021). Usually instituted by procuring local foods for the cafeteria and school meals and using gardens and related curricula to inspire classroom learning, Farm to School programs can manifest in many ways. On a national level, Farm to School loosely began with The Department of Defense (DoD), which has delved into buying fresh produce from farmers, primarily to support the health and nutrition of the United States military members, since World War II (Williams & Tucker-Gruchala, 2017). In the late 1990s, they expanded their services to partner with the United States Department of Agriculture (USDA) so that school nutrition directors could use entitlement funds to purchase fresh produce to serve in their cafeteria (Burt, 2016; Kalb & Shore, 2005; Williams & Tucker-Gruchala, 2017). The result of this partnership was the DoD's Farm to School Program (Kalb & Shore, 2005). The 2002 Farm Bill further promoted this partnership, encouraging school food service directors to buy local when possible (Kalb & Shore, 2005).

The shift in mindset became more noticeable on a public level with the Child Nutrition Reauthorization Act of 2004 where parties concerned about the rising childhood obesity rates viewed Farm to School as a preventative strategy (Bagdonis et al., 2009). Other non-governmental organizations (NGOs), such as the National Farm to School Network and The Community Food Security Coalition, rose in prominence for their promotion of Farm to School initiatives (Bagdonis et al., 2009). These two organizations in particular promoted the use of school gardens to provide nutrition and environmental education (Burt, 2016). The Healthy Hunger Free Kids Act of 2010 solidified nutrition education within Farm to School efforts as a relevant approach to addressing childhood obesity. This act also paved the way for future federal funding, formally establishing the Farm to School grant program (Tonti, 2017).

Georgia’s Farm to School Program

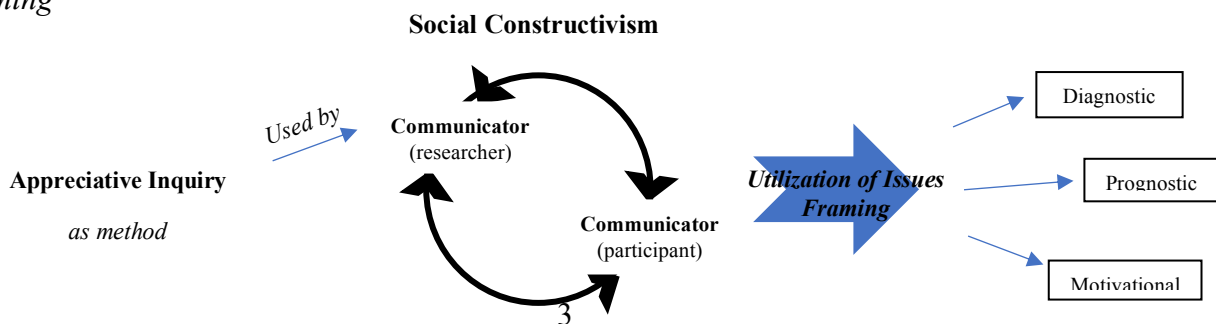
Much like the rise of Farm to School on a federal level, the rise of Farm to School in Georgia followed a similar path: While the National Farm to School Network and the Community Food Security Coalition were two NGOs gaining prominence on the national level, the nonprofit Georgia Organics was rising in name recognition at the state level. Usually credited with formalizing Farm to School in 2008 (Georgia Organics, 2022), several other organizations such as the Wylde Center or formal Agriculture Education programs were already teaching farm to school concepts. Thus, of specific notes are (1) the word *formalize* and (2) the differentiation of *Farm to School* versus *farm to school*. An unspoken but acknowledged tension exists between those who run and quantify Farm to School and those who practice and teach with farm to school concepts to enhance students’ learning. This is not a tension spoken about in existing literature, but rather was a constructed theme in the following study, which sought to explore the history of Farm to School in Georgia. Accordingly, framing theory was used to explore if and how key players in Farm to School in Georgia communicate the original goals of Farm to School versus the issue of ownership in Farm to School. Discussion will ensue around how these messages can be used to reimagine the general practice of farm to school. This study addressed the American Association for Agricultural Education’s National Research Agenda Research Priority 2, “New Technologies, Practices, and Products Adoption Decisions” (Roberts et al., 2016).

Theoretical/Conceptual Framework

Framing theory was used to explore the messaging of Farm to School’s rise in Georgia. Entman (1993) states framing to be a matter of “selection and salience” (p. 52), yet the general idea is that framing considers how ideas are synthesized, organized, and presented (Eko, 1999; Entman, 1993; Maher, 2001). Issues framing was used because it helps examine how individuals construct, interpret, and convey social reality (Hallahan, 1999). Three types of issues frames exist: diagnostic (statement of a problem), prognostic (solution(s) to problem), and motivational (call to action). Epistemological and methodological elements of social constructivism and appreciative inquiry supplemented the tenets of framing theory. Appreciative inquiry roots itself in the social constructivist epistemology and acknowledges that reality is a notion created based on interactions with others (Preskill & Catsambas, 2006). This method of inquiry was used because its call to reimagine the future overlaps with motivational issues framing’s identification of how communication can be used to inspire change. A conceptual model (Figure 1) is presented to situate the construction of this framework.

Figure 1

Exploring the Relationship Between Appreciative Inquiry, Social Constructivism, and Issues Framing



Purpose and Objectives

The purpose of this study was to determine how different key players in Farm to School in Georgia communicate the scope and themes of the program. The relevant questions were:

1. When using an appreciative inquiry approach, what issues frames do key players use to describe and detail the scope of Farm to School in Georgia?
2. What do the constructed issues frames communicate about the past, present, and future directions for Farm to School?

Methods and Procedures

Data Collection

Several methods were used to conduct this study, namely narrative inquiry and respondent-driven sampling. Narrative inquiry was used as the basis for data collection because it seeks to understand the experiences of individuals who experience a phenomenon (Leedy & Ormrod, 2019), in this case, Farm to School in Georgia. The interview protocol was semi-structured and followed the principles of appreciative inquiry. For example, participants were asked to describe stories of collaboration among organizations doing Farm to School or imagine the future of Farm to School programming (Cooperrider et al., 2008). Two experts reviewed the guide, one of whom was familiar with appreciative inquiry and the other interviewing. Respondent-driven sampling was used to recruit participants for this study. As a methodology, this technique is informed by methods such as snowball, key informant, or target, and is especially employed when relevant populations are difficult to determine (Gile & Handcock, 2010; Heckathorn, 1997). As such, this method was used because the key players in Georgia's Farm to School program were hard to determine. Twelve individuals were interviewed, each participant over Zoom with interviews lasting in length between 60 and 75 minutes. All sampling recruitment materials, scripts, and intended population target were approved by the Institutional Review Board at The University of Georgia. Unless stated otherwise, researchers provided the real names of participants and their organizations. This decision was disclosed to and consented upon by the participants. Table 1 provides relevant demographic information.

Table 1

Early champions of Farm to School in Georgia (n=12)

Name	Current Organization	Position/Role
Kimberly Della Donna	Georgia Organics	Director (Farm to School)
Erin Croom	Small Bites Adventure Club	Co-Founder, CEO
Tasha Gomes	FoodCorps	Associate Director (Programs)
Jenna Mobley	Community Farmers Markets	Director (Education), Educator
Jennifer Owens	HealthMPowers	President, CEO
Donna DeCaille	NOSH Nutrition	Founder, CEO
Wande Okunoren-Meadows	Little Ones Learning Center	Executive Director
Holly Thaw	Georgia Department of Education	Specialist (Farm to School)
Nichole Lupo	Atlanta Neighborhood Charter School	Specialist (School Farms), Educator
Kyla Sankara	Fernbank Science Center	Specialist (Instruction)

Stephanie Van Parys
Ashley Rouse

Wylde Center
Captain Planet Foundation

Executive Director
Director (Garden programs)

Data Analysis

Narrative analysis was employed adjacent to narrative inquiry because the former is a method one can use when examining data presented in storied forms (Reissman, 2008). Mishler (1995) proposed a typology for narrative analysis: (1) reference and temporal order; (2) textual coherence and structure; and (3) narrative functions. This specific narrative inquiry study focused on strategy one and sought to construct a telling rooted in the told. To account for the varied lives of the participants, structural and thematic analyses were used in combination. Structural analysis allowed for the slowing down of accounts to distinguish meaning while thematic analysis was used to consider the overarching lessons conveyed in the messages (Reissman, 2008). As such, the participants' accounts were analyzed not necessarily to construct a theory that could describe the individual pieces of findings, rather, what was said was taken at face value to create a wholistically-informed account. Any quotes presented in the results and discussion were shortened and cleaned for ease of reading because the importance of recounting the story was grounded in what was said, not how it was said. However, the intent and essence of the quote remain as true to the original statement as possible.

Immediately following each interview, the recordings were transcribed using NVivo Transcription software. The transcripts were then reviewed and edited for accuracy. Filler words (e.g., ums, uhs, likes) were not included, but changes of thought and repeat words were kept because a thematic narrative analysis approach suggests the entirety of the account or story is more important than dissecting an account into small units of information (Reissman, 2008). While editing the transcripts, any initial ideas about the data were noted (Braun & Clarke, 2006). After, a modified thematic analysis approach (Braun & Clarke, 2006) was used to analyze the data: the first read resulted in initial codes, second and third readings allowed the researcher to collate codes and formulate themes. Upon review, fragments of text and theme definitions were arranged in a typology fashion to construct an adequate explanation of the data.

Validity and Reliability

I engaged in continual reflexivity of myself as a research tool and documented changes in my thoughts via reflective memoing (Leedy & Ormrod, 2019). Reflective memoing was important in informing other triangulation measures. Since I am not from Georgia, I used member checking, follow-up interviews, and retrieval of related data (e.g., government reports, website information, etc.) to verify accounts and dates or program descriptions, respectively. Using appreciative inquiry was also a form of methodological triangulation (Ravitch & Carl, 2021): often I was meeting the participants for the first time, so I aimed to build immediate positive relationships to allow for a sense of trust and companionship. In this way, credibility, dependability, *and* transparency were viewed as validity constructs.

Reflexivity Statement

Qualitative research demands researcher subjectivity. Thus, I would like to state that I am a graduate student interested in applying farm to school as a general educational practice.

Beyond general interest, I have worked on small-scale vegetable farms in several states, so my practical, personal, and professional interests are intertwined and informed by farming in several states and climates. Additionally, I have a background in nutrition education, community gardening initiatives, and small-scale organic agriculture. Much like those in the early 2000s, I, too, wondered how teaching farming and gardening in the context of nutrition education could promote learning about well-being at a young age.

Findings and Discussion

The first question this study sought to address was: *When using an appreciative inquiry approach, what issues frames (diagnostic, prognostic, motivational) do key players use to describe and detail the scope of Farm to School in Georgia?* where diagnostic frames call attention to the problem, prognostic frames to a solution, and motivational frames to calls to action. Six issue frames were constructed from the data and were based on how participants communicated their roles and responsibilities in their work. Briefly these frames were (1) personal background, (2) the issue of child nutrition, (3A) the rise of the Georgia Farm to School Alliance, (3B) the issue of ownership and language, (4) COVID-19's impact on the food system, and (5) the reimagination of Farm to School. It is important to note that the order of these themes represents how they move the message of Farm to School through time. That is, Frames 1-3A cover the early days of Farm to School's conception and growth, Frames 3B and 4 the present-day issues, and Frame 5 the thoughts for the future of Farm to School. The frames were ordered as such based on the second question this research sought to address: *What do the constructed issues frames communicate about the past, present, and future directions for Farm to School?*

Frame 1 [Motivational] – Almost any background experience - no matter the relevance to farming and gardening - can drive one to push the Farm to School movement forward

Among the leaders of farm to school-oriented organizations and the practitioners of farm to school principles, it was clear the leaders were usually in charge of oversight while the educators were on the ground working the programs. Stephanie, when asked about her daily duties, responded laughing, “Everybody thinks I'm weeding. I'm like, “No, I'm not. I'm just weeding emails. That's what I weed.”” Erin and Jennifer, too, expressed that as leaders in their organization, they oversee the organization's strategic direction. Educators like Kyla and Nichole work physically and figuratively on the ground, teaching classes, running horticulture clubs, and tending to plants. As the school's farm specialist, Nichole is also in charge of both internal and external communication about the farm. She stated,

I schedule weekly harvests with our farmers. I communicate with teachers to get their classes involved in the harvest. I communicate with our nutrition staff - and farmers - to determine how much of what needs to be harvested each week based on the menus.

No matter the background experience, one thing was apparent across all the interviews: An individual does not have to be an expert to lead Farm to School. Additionally, no one

background experience necessarily sets anyone apart. Stephanie, a former boss of Nichole's, mused that Nichole's background was in music while Kimberly likewise commented her background was in culinary nutrition. Donna, who has a background in public health, furthermore discussed the idea that Farm to School can succeed on the idea and determination of one person:

I guess in retrospect, it's just funny- I was just that one person. It wasn't a whole department...I was this one person in a huge public health system that believed in it. And so, Farm to School wasn't my idea, but when it came to me, it was like, "Perfect!"...Within systems- It only takes one person who believes in what you're doing.

This ability to impact change - and take pride in accomplishments - was another commonality among participants, all of whom expressed joy in helping move the needle in someone's understanding of the influence of Farm to School programming. Kyla, for example, asked herself what she could do to make a difference for school gardens. She discussed helping at a friend's farm during the pandemic, which inspired her to grow vegetable starts for schools in her area. Several participants also shared their favorite "aha moments," moments where they could quite literally see the recognition and awe in others' faces, be it teachers, other professionals, students, or school nutrition staff. Jennifer shared a particularly vivid account of some students who visited a strawberry farm. She started the story saying it was clear many of the children had never been out on the farm, but by the end of that day they were running around picking strawberries and making their own salad dressing.

The nature of these messages makes it apparent that the common belief among participants is that anyone with a drive to propel a Farm to School program or initiative would surely experience success based on determination alone. These motivations are precisely what pushed these individuals to consider how to harness the power of Farm to School to address the rising issue of childhood obesity.

Frame 2 [Diagnostic] – Farm to School rose based on the notion that something needed to be done for the health and education of the children

No matter the purveyor, innovator, leader, or educator, the individuals pursuing the Farm to School mission found themselves in this work because they saw a need for a new initiative. Ashley, for example, was inspired to do the work because of her daughter:

[M]y daughter entered pre-K and I saw a need for a garden and just for a connection to food...And so I was having breakfast with her pre-K class and just noticed a big disconnect. Went to the principal. He connected me with a teacher, a third-grade teacher. So I approached her one day after school. We ended up starting a garden.

Even more bolstering to this mission is the notion that there is no "right" or "one way" to do Farm to School, especially since the three components of school gardens, classroom

education, and local procurement, when applied in tandem, all work to teach children about the food and the environment. Holly touched on these ideas:

One of the first things I did was help really get the messaging out that Farm to School is not one thing. I realized that we had many people that if you could ask them, like, “Are you in Farm to School?” that they were saying, “No,” and not because they weren't doing it but because they thought if they didn't have a school garden or if they weren't procuring a certain local item or if they weren't doing a certain thing, then they couldn't answer yes to that question.

Beyond clarifying if and how Farm to School programs or various initiatives connect back to addressing childhood health and wellness was the overarching agreement among participants that food, and learning about good food, is a basic human right. Ashley continuing on with her story, explained that “[M]y attraction to it is that I feel like everyone should be deeply connected to where their food comes from... food is a basic human right, and it's kind of silly that we have to grow food to sell food.” Tasha, too, agreed, “Our mission is to make sure that all kids... regardless of their place, race, or class, know what healthy food is. Eat healthy food. Know where it comes from and are equipped to make good decisions.” Stephanie commented,

We really wanted to create the next generation of environmental stewards and kids who weren't scared of worms or insects to care for nature and the environment and know how to grow beautiful things and nutritious food to put into their bodies as an alternative... It builds confidence to know how to do those kinds of things, to connect back to the nature.

Almost every participant had a similar story about watching children’s faces transform with excitement about learning outside. Their accounts solidified the notion that something should be done to incorporate food-based learning activities into young classrooms.

Frame 3A [Prognostic] – The Farm to School Alliance positioned itself as a solution for addressing childhood obesity, and the lack of health and nutrition education

The rise of the Farm to School movement in Georgia is largely attributed to Erin Croom, who returned to Georgia in 2006 after obtaining a Master’s in Community Development and Applied Economics from the University of Vermont. She may be hesitant to accept such a recognition, yet it was, by and large, an applauded accomplishment given to her by the participants. Her work in Vermont largely informed the development of Farm to School in Georgia, which she began on her own before being hired by Georgia. Erin mentioned, “[W]e were a tiny nonprofit, I had no funding... and the concept with Farm to School was a little weird. There was very little support for this program, so I knew that we needed some structure and validation around it.” To build up this support, Erin continued, laughing slightly, “I called the Georgia Department of Public Health, and I said, ‘Hi. Would you like to join the Farm to School Alliance? It's a coalition of state and federal partners that help kids eat more fruits and

vegetables.” Donna was of these individuals who answered the call and likewise mentioned the team was small at first. She added, “I remember us having debates about, ‘Okay, how are we going to get Georgia Department of Agriculture on board?’” Funding, as well as eventual partnerships, came along, especially around 2010 when the Healthy Hunger Free Kids Act established said validity around Farm to School programs.

Despite these early challenges in securing partnerships and funding, the Alliance has stood the test of time. Jennifer, another initial player in the movement said its biggest accomplishment is “[t]he fact that the Farm to School Alliance is still around and functioning...I mean, that's long-term infrastructure. It's agency, largely state agency based, which means...policy infrastructure.”

Georgia has certainly built a name and an infrastructure for the longevity of its Farm to School movement, but it is also widely recognized because of its efforts in collaboration and celebration. Several county school districts, such as Burke, Jackson, Effingham, and Baldwin, were repeatedly mentioned as having amazing Farm to School programs. The Golden Radish awards, an award program that recognizes and celebrates the best practices of school nutrition districts across the state, too, were listed as a shining example of celebration and collaboration.

Over time, the Alliance has morphed from a solution to combatting childhood obesity to a “place to know.” Nichole commented it is “an opportunity to collaborate, to share resources, to make connections, to sort of stay abreast of what other organizations are doing, what initiatives they had in place, or what they're having success in, or finding challenges with.” Erin, too, agreed, and stated, “[the Alliance] means a network of partners that share a common goal but bring different resources to the table.”

Frame 3B [Diagnostic] – Though a place to know, the Farm to School Alliance has inadvertently created an issue of "ownership" of Farm to School

The Alliance in its early days was small: several state agencies, a few nonprofits, and some gung-ho teachers from here and there. As it has grown, the work of those on the ground, especially those outside the Atlanta and Athens areas, has been lost due to a lack of representation or ability to attend Alliance meetings. Of interest during the interviews was a sneakily growing count of the number of times participants mentioned the word “silos.” Ashley, for example, elucidated this point when she commented,

Sometimes what I've found in this work, especially as it relates to the Alliance, is that we're still working in silos. We meet on a quarterly basis, but we're still not talking about and sharing our stories enough to know what each other's doing.

Donna, too, remarked on this point, musing that “there were little pockets of Farm to School, and I think one of the most novel things is that people went around and found those little pockets and were able to connect into a uniform purpose.” Over time, though, she does not think

it is sustainable, stating that if it stayed in a pocket, it may just become an elitist idea “available to people with money.” Wande mentioned, too:

There's a lot of black and brown schools that are doing this work and don't call it 'Farm to School.' And so, you're not going to get the true numbers because some people feel that it's co-opted, right? Like this, this is a term that was just made up - Farm to School - that was just made up. But there's been people that have been doing this work before the term 'Farm to School' came up...Where are your black and brown communities in the Farm to School conversations? You know? Because we're just so narrowly defining what Farm to School is.

When you get down to it, what is Farm to School, really? These participants - and research - purport it to be a legitimate and necessary part of children's education, an encompassing, tangential, and actualizing education that enhances learning among core subjects. So, is it a question of Farm to School, farm to school, or something else entirely?

Frame 4 [Diagnostic] – COVID-19 as an overarching "thing" revealed many gaps in the food system and exacerbated the lack of representation issues

At this point, no one is a stranger to the widespread effects of the pandemic, especially the participants running teacher training programs or instituting Farm to School programs for children. Jenna, for example, talked about the pressures related to a lack of resources for teachers in charge of these programs:

I think one of the biggest constraints right now is money - and money for people...it's hard to get grant funding for people. And I think there is certainly a limit on the amount of hands-on education that the teachers that are in the schools right now can provide during this time, specifically during the time of COVID and all of those restrictions and how stretched thin teachers are.

Other issues highlighted by the pandemic were mental health and racial equity. Holly and Ashley focused on how the pandemic has forced many to reckon with overarching gaps in the food system. Ashley specifically pointed to Project Giving Gardens, which was established as a response to COVID-19. She described it, saying, “We leveraged our school garden partners to hire growers to plant gardens and maintain them to harvest food from - and start giving back to the communities that the schools are a part of or that they exist in.” When asked if she thought the program would continue, she immediately responded:

Yes, because what we know is that food insecurity is something that people deal with on a regular basis and the pandemic just exacerbated that. I'm going to continue to operate the program during the summer breaks to harness that summer growing season so that we can continue to do our part in addressing food insecurity and access that is often fueled by systemic inequities.

Though perhaps an unwelcome surprise, COVID-19 as an international problem revealed the need for system-wide changes that could have better implications for all.

Frame 5 [Prognostic] – Farm to School is a "three-pronged thing" that requires three prongs of re-imagination

No organization, network, or *thing* will be without its issues, difficulties, and challenges. The Farm to School Alliance, as previously mentioned, initially positioned itself to be a solution for preventing childhood obesity. Over time, the Alliance grew, so much so that members unknowingly were repeating their efforts in programming. Issues of ownership and language, as well as the pandemic, exacerbated growing frustrations around this lack of communication. The result of these problems is a three-fold reimagination of the current Farm to School model. For example, what if every school had a garden for children to learn in and from? Kyla dreams of having a teaching farm or garden – as if a Rooms to Go but for school gardens – a place to show “five different ways to make a pathway in a garden and different kinds of fences.” She wants it to be a place “they can pick and choose what was going to work best and really see how their decisions would look if carried out.” And what if, as Jennifer said, local procurement solutions focused on redefining food as a public good? She expanded upon her idea, stating,

We've got to figure out this procurement question. And for me, it stems back to needing to redefine food as a public good. Because you're not ever going to make the dollars work...the economics are never going to work for a cash-strapped school system that serves 70%+ free and reduced lunch students...So something's got to change on like the economic model to make that happen.

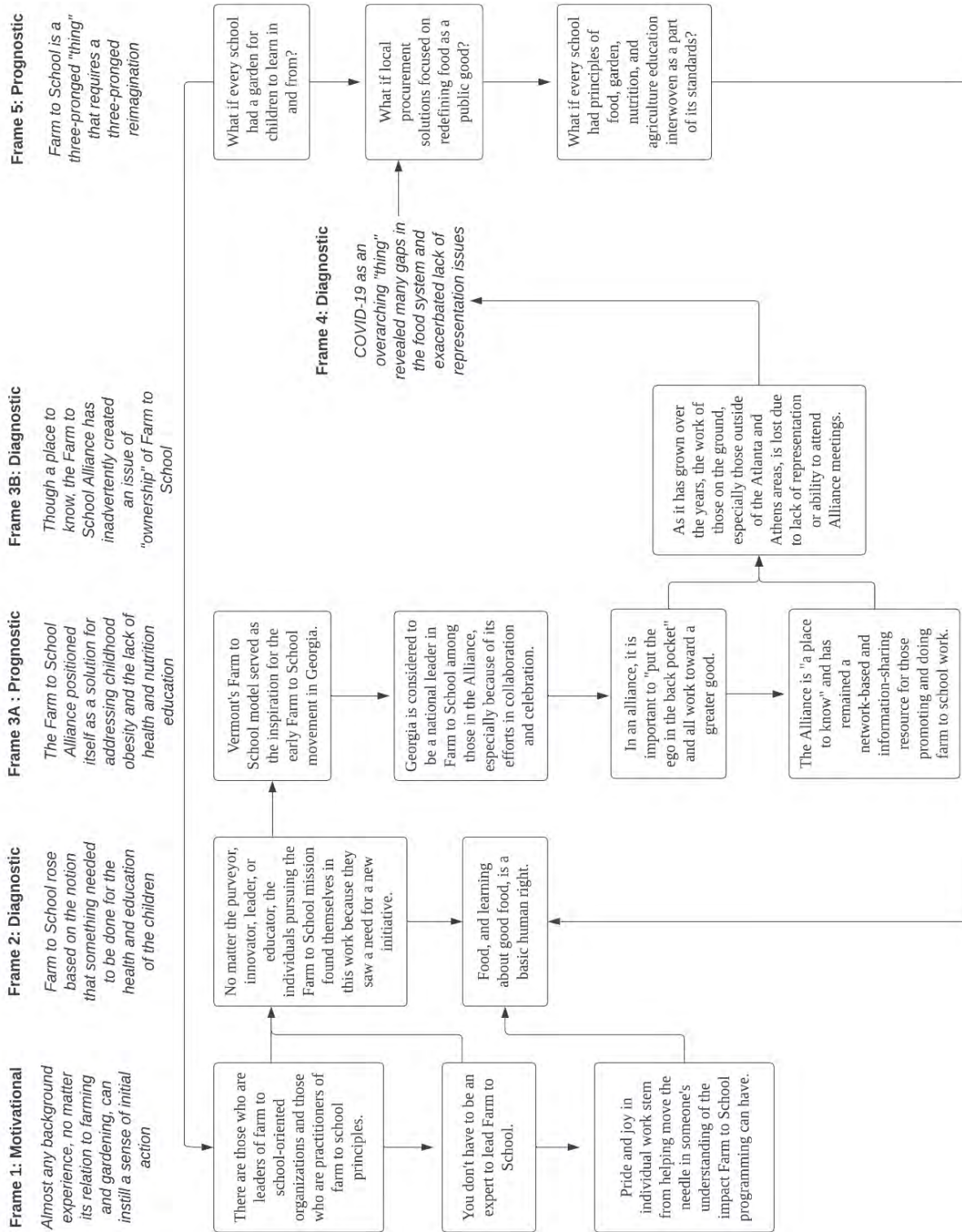
And finally, what if every school had principles of food and agriculture education woven into its standards? What if food education became such a part of the school system, it was no longer an afterthought or a retroactive solution? And furthermore, what if the system valued teachers to teach such concepts? For example, Nichole commented, stating, “I think that being really strategic and intentional about securing funding for experts in the field. So, seeking out funding to start a scratch nutrition program and then hiring folks who have foodservice service backgrounds.” Stephanie, too, lamented about the lack of time to share such good practices, reminiscing that she used to love to follow her educators around and take pictures of their good work.

Conclusions, Recommendations, and Implications

The goal of this study was to examine the current messages of Georgia’s Farm to School program. Research question one focused on the issues frames used by participants to describe the scope of Farm to School in Georgia, where each frame can work separately or in tandem. In the case of Farm to School, six total frames were constructed and are represented in Figure 2.

Figure 2

Visual Typology of Farm to School in Georgia



To define said constructed issues frames is one matter, but more important is the exploration of how said frames act, in other words, research question two, which sought to parse how the frames move the messaging of Farm to School through time. Frames 2 and 3A, for example, complement each other: the former identifies the issue while the latter presents a solution. The key themes for each frame also move the message through time. For example, Frame 2 calls attention to the ingenuity of each participant: they saw a need and decided to act on behalf of children's health. Over time, the recognition of the problem and impetus for change became more rooted in the idea that today's children more than ever should be empowered by the knowledge of food. In Frame 3A, too, those of the Farm to School Alliance initially served to be advocates for raising children's health. Now, the population pool has grown, and the Alliance serves as more of a clearinghouse. The goal of the Alliance is still inherently the same, but there are fewer instances of innovation and more of program adaptation and collaboration. Together, these frames suggest that those of an alliance should be able to rally behind a clear set of shared goals and initiatives.

Farm to School at its core remains to be a program designed to connect - and reconnect - children back to nature and the soil. Each facet of the program was and remains defined as important components of the Farm to School model. However, in taking on issues framing as a theoretical lens, it is important to note the afore-presented typology is not necessarily conducive across every Farm to School program. Frames are constructed and interpreted by individuals; likewise, they are constructed and communicated to an individual by another individual(s). Despite an inherent researcher positionality and bias, which is prevalent in all forms of qualitative research, the typology still seeks to convey overarching messages for anyone looking to start applying general farm to school-based practices.

To that end, there are several recommendations for future research. One consideration is that of Farm to School versus farm to school practices. Future research should endeavor to discourse the differences in appearance and thought of giving Farm to School a capitalized name versus upholding it as a credible, experiential learning practice. Examining the differences between how individuals name their "Farm to School" programs may also reveal why Frames 3B and 4 are diagnostic frames. Said another way, examining this tension may further reveal how and why food system issues are increasingly at the forefront of today's concerns.

Another area of exploration for future research is uncovering the work of those whose efforts are often overlooked or missed entirely. Several participants highlighted that it was not them running the programs but their educators, yet when they asked who else could shed light on the scope of Farm to School in Georgia, education programs were mentioned only generally and the champion educators not at all. Future research should thus seek to discover who these enamoring educators are, why they are not listed as the forefront of innovative Farm to School practices, and what they are doing that makes them stand out. This research could further pave the way for other educators looking for a guide to implement pieces of Farm to School in their setting.

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A Longitudinal Examination of Noncognitive Skills in Secondary Agricultural Education Students Across the COVID-19 Pandemic

Abstract

Student academic achievement relies in part on noncognitive abilities. Noncognitive abilities including grit, optimism, self-efficacy, and locus of control can all contribute to student success both in the classroom and in careers. Previous examinations of noncognitive skills in agricultural education students showed noncognitive abilities above adolescent averages. Development of noncognitive skills can be impacted by educational environment, instability, and a lack of opportunity. The educational changes resulting from the COVID-19 pandemic had the potential to impact secondary student development of noncognitive skills. In this study, we examined noncognitive scores for state-level CDE and LDE participants in Idaho in Spring 2018 and Spring 2022, points before and after educational changes related to COVID-19. Through our examination, we found significant differences in student grit, self-efficacy, and locus of control across the distributions. Results indicate empirical evidence of shifts in noncognitive skills for this population of secondary agricultural education students and allow us to make recommendations for helping students continue to develop noncognitive skills in a post-pandemic educational environment.

Introduction/Conceptual Framework

Developing noncognitive skills in students is universally agreed upon by researchers and practitioners as beneficial to students in the classroom (Duckworth, 2007; Jew, et al., 1999; Multon, et al., 1991). Gains in noncognitive skills are associated with increased academic performance and success, lower levels of stress and depression, increased sense of belonging among peers in the class, and an increased likelihood of students to pursue higher education (Duckworth, et al., 2007; Eskreis-Winkler, et al., 2014; Blalock, et. al., 2015; Kleiman, et al., 2013). Noncognitive skills are defined as patterns of thought, feelings, and behavior that impact a person's overall outlook on life and can influence motivation and decision-making (Borghans, et al., 2008). Noncognitive skills are examined widely throughout educational literature, although researchers use a wide variety of terms to describe them including social emotional learning competencies (SEL), 21st century skills, employability skills, growth mindsets, academic success behaviors, and others all directly relate to the root concepts associated with noncognitive skills (Almeida, 2016; Brunello & Schlotter, 2011; Duckworth & Yeager, 2015). While many of these terms are retooled by researchers as they examine emerging concepts in education, the core concepts behind each of these terms refer to the same fundamental idea that noncognitive skills are independent of cognitive ability, are beneficial to students, are influenced by personal and environmental factors, and are dependent on situations that the student is in (Duckworth & Yeager, 2015).

There are many characteristics that fall into the noncognitive category (Duckworth, et al., 2007; Rotter, 1966; Bandura 1997; Carver, et al., 2010). Among the lists of noncognitive skills, four concepts often emerge as composite concepts encompassing numerous noncognitive skills: grit, optimism, self-efficacy, and an internal locus of control. Grit is perseverance and passion

for long-term goals (Duckworth, et al., 2007). Optimism reflects the extent to which people hold generalized favorable expectancies for their future (Carver, et al., 2010). Self-efficacy is an individual's belief that they can complete a certain task or execute a specific skill (Bandura, 1997). Locus of control is an individual's belief that a particular outcome in life is caused by environmental factors or their own actions (Rotter, 1966). These factors both individually and combined have been linked to increased educational achievement, career retention, and even a decrease in depressive thoughts and behaviors (Duckworth et al., 2007; Eskreis-Winkler, et al., 2014; Blalock, et al., 2015; Twenge, et al., 2004).

The development of noncognitive skills can be influenced by a wide array of personal and environmental factors (Bandura, 1997; McCormick, 2002; Usher & Pajares, 2008; Evans & Bandura, 1989; McClun & Merrell, 1998; Alan, et al., 2019; Meacham et al., 2020; Ford et al., 2019). Suggestions for developing noncognitive skills include prolonged personal engagement with caring mentors, stability in educational programming, and self-reflection on personal growth factors (Khine & Areepattamannil, 2016). Expanding learning beyond the confines of a classroom is often noted as one of the best opportunities to practice and develop noncognitive skills (Covay & Carbonaro, 2010). Structured learning opportunities outside the traditional classroom setting and increases in noncognitive skills are also associated with lower rates of depressed moods in adolescents; especially true for students with high support from an adult leader (Mahoney, et al., 2002). Agricultural Education could be poised to provide these growth opportunities to students.

Meacham et al. (2020) examined the noncognitive skills of student leaders in Career and Technical Student Organizations (CTSOs) $n = 443$ and found that CTSO students scored higher in grit than the reported average for adolescents with an average of $M = 3.59$ compared to the adolescent average of $M = 3.40$, on a 1-5 scale. This supported the work of Ford et al. (2019) and [Author, et al., 2020] who studied noncognitive skills in FFA members participating in Career Development Events (CDE) and Leadership Development Events (LDE) and found grit scores above the adolescent average. Suggestions from previous work in agricultural education include revisiting components of competition embedded in secondary agricultural education programs and focusing on areas where noncognitive skills are poised to develop (Jones & Edwards, 2019).

While preventing the spread of COVID-19, social isolation had broad potential for slowing or halting many of the components of the educational system that can help students develop noncognitive skills (Son, et al., 2020). On March 11, 2020, the World Health Organization officially declared the coronavirus disease-19 (COVID-19) outbreak (Centers for Disease Control and Prevention, 2022). On March 23, 2020, the Idaho Board of Education ordered all public schools to close their doors (Centers for Disease Control and Prevention, 2022; Lycklama, 2020). All students were required to complete off-campus instruction for the duration of the 2020 school year, and many included closures or hybrid school systems through the 2020-21 school year.

The United States Department of Education gathered data from multiple surveys regarding student mental health and reported students had "heightened levels of stress and anxiety, feelings of disappointment, sadness, loneliness, and isolation" (Goldberg, 2021, p. 43) since the start of the COVID-19 pandemic. School faculty echo similar concerns about students

in the academic year since the end of many school shutdowns (Pokhrel & Chhetri, 2021). Empirical data related to the impact of the COVID-19 pandemic in secondary education students is currently limited, but this data could help inform teaching strategies that will help students succeed.

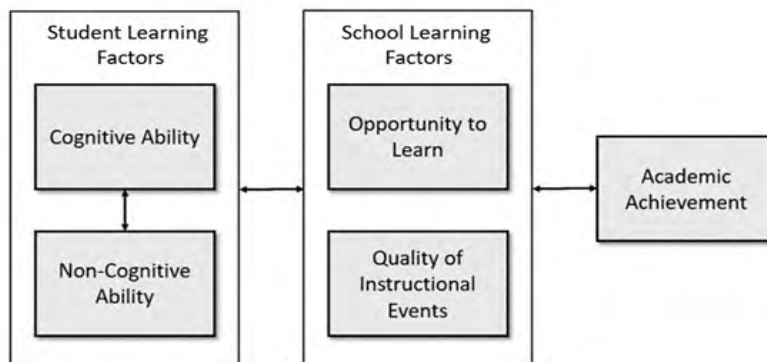
The pandemic occurred during our ongoing longitudinal study of noncognitive skills in secondary agricultural education students. The targeted purpose of this study is to examine noncognitive skills in Idaho FFA secondary students who participated in state Career Development Events (CDE) and Leadership Development Events (LDE) prior to and across the COVID-19 pandemic to examine potential shifts in noncognitive skills from spring of 2018 to spring of 2022. Understanding the noncognitive skills of a group of students can provide educators with information so that teaching and learning methods can be tailored to the needs of those students. Describing noncognitive skills at these two cross-sectional moments can allow educators to better assist students as they continue to hone noncognitive skills in the aftermath of the educational changes brought about by the response to COVID-19.

This study draws its conceptual framework from Bloom’s (1976) model of student achievement to describe student cognitive and noncognitive factors for academic achievement. Bloom (1976) built upon his concepts of cognitive levels by classifying learning as an interaction between cognitive ability and what Bloom referred to as “affective behaviors.” Farrington (et al., 2012) suggested the affective behaviors Bloom referred to were better classified as noncognitive factors. We modified Bloom’s (1976) model to include the suggested change.

The resulting conceptual model situates academic achievement as a function of the levels and interaction of student learning factors (cognitive ability and noncognitive skills) and school learning factors including the opportunity to learn and the quality of instructional events as shown in Figure 1.

Figure 1

Conceptual model of factors impacting student academic achievement. Adapted from Bloom (1976).



Within this model, we posit that school factors, including both opportunities to learn and the quality of instructional events, were potentially impacted by school changes necessitated

through the COVID-19 pandemic. By examining comparison groups of students both before and after these school changes, we may be able to describe the noncognitive skills of secondary students both before and after the pandemic to draw parallels in the student experience at this pivotal time in education.

Purpose and Objectives

The purpose of this portion of a larger study was to describe noncognitive skills in Idaho FFA members who participated in state Career Development Events (CDE) and Leadership Development Events (LDE) across the COVID-19 pandemic, including a comparison of scores prior to the COVID-19 pandemic and scores two-years following initial CDC pandemic quarantines. To reach this purpose, the following objectives guided the study:

1. Describe the noncognitive skills of secondary students competing in state Career Development Events and Leadership Development Events in Idaho in Spring 2018 and Spring 2022.
2. Examine differences between the noncognitive skills of secondary students competing in state Career Development Events and Leadership Development Events in Idaho and based on personal factors (sex, year in school, event participated in).
3. Describe differences in secondary students competing in Idaho FFA Career Development Events and Leadership Development Events between data collections points in Spring 2018 and Spring 2022.

This research will allow for future research to make recommendations to better serve students in the era of the COVID-19 pandemic and fill the gap in the current literature. The examination will allow us to examine students' perceived ability to demonstrate grit and overcome COVID-19 related challenges, explore how student self-efficacy has maintained or changed, assess the impact of COVID-19 related environmental changes on optimism, and determine if regulations and oversight have impacted the control students perceive over their lives. Conducting this research could provide a platform for discussion into what has happened to students in CTSOs in Idaho across the pandemic and could allow us to make recommendations for the best way to address noncognitive skills in a post-pandemic educational system.

Methods

This study was a cross-sectional descriptive study that allowed us to examine the noncognitive skills of Idaho FFA members who competed at state level CDEs and LDEs across two points before and after the COVID-19 pandemic. We used survey methods to gather self-reported data for noncognitive skills along with demographic characteristics. Data collected in Spring 2018 and Spring 2022 were compared to describe if and how noncognitive skills changed across the COVID-19 pandemic.

The population of this study was a census of Idaho FFA members who competed in state CDE and LDE events held at the Idaho FFA Convention in Spring 2018 ($N = 413$) and Spring 2022 ($N = 348$). To find groups of students before and after the pandemic, we sought

information from stable comparison groups. We selected state-level CDE/LDE competitors from 2018 and 2022 as these participants represent numerous locations in the state and have relatively similar demographic characteristics over time. We wholly recognize the specialized population as a potential limitation of this study and caution against the generalization of the findings from this study to other populations, as this census is not representative of all Idaho FFA members, or school-based agricultural education (SBAE) students. The number of students participating in each event differed depending on the eligibility of students for the event. Some events required a district level qualification and others had no requirement at all. A description of participants in each event is described in Table 1.

Table 1

Participation numbers for 2018 & 2022 Idaho Spring CDE/LDE Events (n = 724)

Event	2018 <i>n</i>	2022 <i>n</i>	Type	Eligibility
Agricultural Issues Forum	45	16	CDE	One team per chapter
Agricultural Sales & Service	38	33	CDE	One team per district (4)
Conduct of Chapter Meetings	--	51	LDE	One team per district (7)
Creed Speaking	10	10	LDE	District winner advances (1)
Employment Skills	10	8	LDE	District winner advances (1)
Extemporaneous Public Speaking	10	8	LDE	District winner advances (1)
Farm Business Management	40	43	CDE	One team per district (4)
Floriculture	107	77	CDE	One team per chapter
Nursery/Landscape	53	--	CDE	One team per chapter
Parliamentary Procedure	60	53	LDE	One team per district (6)
Prepared Public Speaking	10	8	LDE	District winner advances (1)
Poultry	--	34	CDE	One team per chapter
Total Spring CDE/LDE participants	383	341		

Note. Nursery/Landscape was moved to a summer CDE in 2021; Conduct of Chapter Meetings and Poultry were not recognized as a state LDE/CDE until 2022.

Data were collected using paper instruments and the instruments were used to ask the same questions in 2018 and 2022. Section one allowed participants to provide demographic information including name, gender, age, year at school and FFA chapter. Section two was the short form of Duckworth's (2015) grit scale which included 10 Likert-type response items, on a scale from 1-5, where 5 was the highest level of agreement. The third section was a modified version of the 10-item life orientation test (LOT-R). Scheier, Carver, and Bridges (1994) designed the LOT-R to allow respondents to examine optimism through rating levels of agreement with statements on 1-5 scale with 5 indicating the highest level of agreement. The fourth section of the instrument was The General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995) which allowed respondents to respond to 10-items. The items were modified to a 10-point Likert scale from 1 (not confident) to 10 (confident) as suggested by Bandura (1994). The fifth section of the instrument was the complete 23-item locus of control questionnaire developed by Rotter (1966). Each item in this section was dichotomous, with statements indicating both an internal and external locus of control. Respondents selected the item in each

pairing that most closely aligned with their views. Scoring included accumulating 1 point for selecting the item in each pairing associated with an internal locus of control and 0 points for selecting the item associated with an external locus of control. Overall scores on this section range from 0 - 23, with higher scores indicating a more internal locus of control and lower scores indicating a more external locus of control.

The instrument used in this study was previously examined by a panel of four agricultural education faculty members and one curriculum and an instruction faculty member over eight separate distributions to determine content validity and readability. Although previous reliability estimates were available for each instrument, we also calculated post hoc reliability following these two distributions. Reliability estimates yielded Cronbach’s alpha levels for Grit-S ($\alpha = 0.72$), LOT-R ($\alpha = 0.78$) and the GSE ($\alpha = 0.90$). A KR-20 was used to calculate post hoc reliability of the locus of control instrument ($\alpha = 0.78$). Nunnally & Bernstein (1994) states that alpha levels at 0.70 or above are acceptable. Reliability estimates are summarized in Table 2.

Table 2

Instrument Reliability Summary

Instrument	Items	Scale	Previous Reliability	Post Hoc Reliability
Grit	10	1-5	0.82	0.72
Optimism	10	1-5	0.88	0.78
Self-efficacy	10	1-10	0.76-0.96	0.90
Locus of Control	23	0-1	0.78	0.87

Note. Rotter’s (1966) Locus of Control instrument is dichotomous, a KR-20 was used to determine reliability estimates

Data were collected at the orientation of each individual CDE and LDE event. [Institution] IRB approval was obtained prior to collecting information from any participant. A parent/guardian informational sheet was distributed with event registration which included information about their rights as a parent/guardian, their students’ rights as research participants, and opt out procedures. Participants completed assent information including a signed assent form prior to participating in this study. Our team worked with Idaho FFA CDE/LDE Superintendents to distribute instruments at event orientation. As an incentive for students to participate in the survey, all participants received FFA themed stickers and full-size candy bars. In 2018, we received completed assent and instruments from $n = 383$ of the $N = 413$ competitors, a response rate of 92.9%. At the 2022 distribution $n = 341$ of the $N = 348$ competitors completed the consent/assent process and provided completed instruments, a response rate of 98%.

Questionnaires were hand scored by the primary researcher. Data from the instruments were then entered into a Microsoft Office Excel spreadsheet by the primary research team member. A random sample of 10% of instruments was then selected following completion of data entry to validate entry consistency and accuracy. Descriptive results were calculated using IBM SPSS v 26 to describe the frequencies and percentages for demographic information and the mean and standard deviation for grit, optimism, locus of control, general self-efficacy scores, and situational self-efficacy scores. One way analysis of variance (ANOVA) and t tests were used to

examine differences based on demographic information. To examine differences from 2018 to 2022, data were analyzed using independent samples *t* test to determine if differences existed between performance level based on grit, optimism, and situational self-efficacy scores. An independent samples *t* test is the appropriate tool to use when examining differences between dichotomous categorical or ordinal dependent variables and a continuous independent variable (Lakens, 2013).

Respondents ranged in age from 13 to 18 years old, with an average age of $M = 16.73$ ($SD = 1.22$). Students were from 7th to 12th grade with the highest proportion in their junior year of school ($n = 128$ (33.5%) in 2018 and $n = 92$ (28.6%) in 2022). The majority of participants at across both data collections were female ($n = 453$, 61.9%). A similar proportion of respondents participated in the CDE and LDE events across data collections, and the grade breakdowns were similar for the 2018 and 2022 events.

Findings

We examined noncognitive scores for participants in the 2018 and 2022 Idaho State FFA CDE and LDE participants holistically and based on demographic characteristics. In 2018, participants' reported grit scored ranged from 1.8 to 4.9 ($M = 3.66$, $SD = 0.51$) and in 2022 reported scores ranging from 2.1 to 4.9 ($M = 3.56$, $SD = 0.52$). Participants in 2018 reported scores from 0.0 to 5.0 on the LOT-R, which measures optimism ($M = 3.36$, $SD = 0.74$) and reported scores of 1.5 to 5 with a mean of $M = 3.36$ ($SD = 0.74$) in the 2022 data collection. On the General Self-Efficacy Scale, participants reported scores from 1.0 to 10.0 in 2018 with a mean self-efficacy score of $M = 6.18$ ($SD = 1.51$). Self-efficacy scores in 2022 ranged from 0 to 10 ($M = 7.48$, $SD = 1.38$). Scores for locus of control are on a scale from 0-23, with a higher score indicating a more internal locus of control. In 2018 participants' locus of control scores ranged from 2.0 to 21.0 ($M = 16.23$, $SD = 2.32$) while in 2022, respondents reported locus of control ranging from 0 to 20 ($M = 11.92$, $SD = 3.41$). Results of noncognitive scores for both distributions are shown in Table 3.

Table 3

Noncognitive Scores for 2018 and 2022 Idaho CDE/LDE Competitors (n = 723)

Noncognitive Category	2018 Collection (n = 382)				2022 Collection (n = 341)			
	Min	Max	M	SD	Min	Max	M	SD
Grit	1.8	4.9	3.66	0.51	2.1	4.9	3.56	0.52
Optimism	0.0	5.0	3.44	0.71	1.5	5.0	3.36	0.74
General Self-efficacy	1.0	10.0	6.18	1.51	0.0	10.0	7.48	1.38
Locus of Control	2.0	21.0	16.23	2.32	0.0	20.0	11.92	3.41

Note. Grit and optimism scores reported on a 1 – 5 scale. General self-efficacy and situational self-efficacy reported on a 1 – 10 scale. Locus of control reported on a 0-23 scale.

Noncognitive skills examined in relation to gender and grade in school. To prevent identifying respondents through the reporting process, information for those who did not prefer to report gender, along with 7th and 8th grade students are not shown. Grit scores based on distribution and demographic characteristics is shown in Table 4. Female grit scores ($M = 3.69$,

SD = 0.53) were noted above male in 2018 ($M = 3.62$, $SD = 0.46$), while male grit scores ($M = 3.60$, $SD = 0.47$) were observed above females ($M = 3.54$, $SD = 0.55$) in 2022. Seniors were observed to have the highest grit scores in both 2018 ($M = 3.73$, $SD = 0.47$) and 2022 ($M = 3.65$, $SD = 0.53$).

Table 4

Grit Scores Based on Demographic Variables

Characteristic	2018 Collection ($n = 382$)			2022 Collection ($n = 341$)		
	n	M	SD	n	M	SD
Gender						
Female	241	3.69	0.53	212	3.54	0.55
Male	117	3.62	0.46	124	3.60	0.47
Year in School						
9 th	55	3.60	0.58	82	3.55	0.54
10 th	86	3.58	0.51	86	3.46	0.56
11 th	128	3.69	0.51	92	3.62	0.47
12 th	111	3.73	0.47	60	3.65	0.53

Optimism scores based on demographic characteristics are shown in Table 5. Resulting scores for females ($M = 3.49$ in 2018 and $M = 3.38$ in 2022) are at a marginally higher level than males ($M = 3.36$ in 2018 and $M = 3.37$ in 2022), and the highest noted optimism among students was in their junior year ($M = 3.50$ in 2018 and $M = 3.50$ in 2022).

Table 5

Optimism Scores Based on Demographic Variables

Characteristic	2018 Collection ($n = 383$)			2022 Collection ($n = 341$)		
	n	M	SD	n	M	SD
Gender						
Female	241	3.49	0.70	212	3.38	0.74
Male	117	3.36	0.67	124	3.37	0.72
Year in School						
9 th	55	3.42	0.72	82	3.36	0.75
10 th	86	3.46	0.61	86	3.28	0.67
11 th	128	3.50	0.63	92	3.50	0.74
12 th	111	3.42	0.70	60	3.30	0.85

Resulting scores for self-efficacy for males ($M = 6.43$ in 2018 and $M = 7.65$ in 2022) were greater than scores for females ($M = 6.05$ in 2018 and $M = 7.39$ in 2022). The highest, average self-efficacy score was observed among students in their junior year ($M = 6.37$ in 2018 and $M = 7.81$ in 2022). General self-efficacy scores based on demographic characteristics are shown in Table 6.

Table 6*General Self-efficacy Scores Based on Demographic Variables*

Characteristic	2018 Collection (<i>n</i> = 383)			2022 Collection (<i>n</i> = 341)		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Gender						
Female	241	6.05	2.49	212	7.39	1.38
Male	117	6.43	2.53	124	7.65	1.38
Year in School						
9 th	55	5.78	2.67	82	7.48	1.19
10 th	86	6.05	2.64	86	7.19	1.41
11 th	128	6.37	2.41	92	7.81	1.30
12 th	111	6.26	2.44	60	7.73	1.34

Note. General Self-Efficacy scores range from 1 – 10.

Locus of control findings are shown in Table 7. In 2018, female scores ($M = 16.89$) were above males ($M = 15.23$). The opposite finding occurred in 2022, with male locus of control scores ($M = 12.45$) reported at numbers above females ($M = 11.68$). The greatest scores based on school year were observed among seniors in 2018 ($M = 16.82$) and at the junior level in 2022 ($M = 11.68$).

Table 7*Locus of Control Scores Based on Demographic Variables*

Characteristic	2018 Collection (<i>n</i> = 382)			2022 Collection (<i>n</i> = 341)		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Gender						
Female	241	16.89	2.88	212	11.68	3.32
Male	117	15.23	3.24	124	12.45	3.50
Year in School						
9 th	55	14.47	2.67	82	11.88	3.17
10 th	86	15.66	3.14	86	10.88	3.05
11 th	128	16.46	3.65	92	11.68	3.50
12 th	111	16.82	3.81	60	11.30	3.89

To examine differences between demographic characteristics for each of the cross-sectional data collections, independent t-tests were conducted. Those indicating “prefer not to respond” for gender were eliminated prior to analysis leaving an analysis of respondents who indicated male or female. In 2018, there were 3 students who selected “prefer not to respond.” In 2022, there were 6 students who selected “prefer not to respond.” No differences existed in the 2018 data collection based on gender for any of the noncognitive factors including grit ($t(379) = -1.11, p = 0.26$), optimism ($t(379) = -1.73, p = 0.24$), self-efficacy ($t(379) = 1.39, p = 0.16$), or locus of control ($t(379) = -2.11, p = 0.06$). In the 2022 data collection, differences were observed based on

gender for self-efficacy ($t(334) = -1.68, p = -0.57$) and locus of control ($t(334) = 2.22, p = -0.01$), while no differences were observed for grit or optimism.

Differences in noncognitive factors based on grade in school were examined using a one-way ANOVA. In the 2018 distribution a difference was noted between grades for locus of control ($F(3, 379) = 3.92, p = 0.01, \eta^2 = 0.13$). Subsequent examination revealed that lower classmen (grades 9 & 10) had significantly lower locus of control scores than upper classmen (grades 11 & 12). No significant differences were found for grit, optimism, or self-efficacy based on grade in the 2018 data collection. Analysis of 2022 data revealed differences in self-efficacy based on year in school ($F(3, 316) = 3.77, p = 0.01, \eta^2 = 11.30$), with sophomores having lower self-efficacy than freshmen, juniors, or seniors.

We conducted independent t-tests to determine if differences occurred between 2018 and 2022 for each of the four noncognitive factors. Differences were found between distributions for grit ($t(722) = 1.96, p = 0.01$), self-efficacy ($t(722) = -2.21, p = 0.03$), and locus of control ($t(722) = -4.88, p = 0.01$). Further examination revealed that between 2018 and 2022 respondents had lower grit scores, higher self-efficacy scores, and a more intrinsic locus of control.

Conclusions/Recommendations/Implications

Noncognitive skills are critical to student success and often are a better indicator of academic achievement than cognitive ability (Khine & Areepatteamannil, 2016). Through this study, we were able to examine Idaho FFA member noncognitive skills across several years. When we set out to collect this information, we were unaware that the longitudinal study would span the course of a global pandemic, which had massive implications for educational systems, and by extension secondary students (Pokhrel & Chhetri, 2021). Because of this study and the unique glimpse into before and after pandemic changes, we are able to discuss noncognitive factors with two groups of students who were competing in the same events, four years apart across the COVID-19 timeframe. Again, we caution generalizing these conclusions outside of the bounded population.

No differences were found based on gender in the 2018 distribution. In the 2022 distribution, males had a more internal locus of control compared to their female counterparts. This contradicts previous findings in adolescents indicating females tend to have a more internal locus of control compared to their male peers (Manger & Eikeland, 2000), but validated previous work in career and technical education and reinforces the findings of Meacham, et al. (2020) who found in a study of CTSO students males had a more internal locus of control compared to female peers. This allows us to postulate that there may be something in CTE programming that is either attracting males with more intrinsic locus of control, or helping male students gain more intrinsic motivation. While differences did occur, it is important to note that females and males at both distributions in this study had more intrinsic locus of control than the reported adolescent averages. More work is needed to determine how and where locus of control is developed in agricultural education students. One of the hallmarks of developing an intrinsic locus of control is allowing young people to have autonomy over what they spend their energy on (Rotter, 1966). Perhaps it should not be surprising to see more intrinsic locus of control in students who are taking a voluntary role as a CDE/LDE competitor. We recommend additional examinations to

locus of control both general and situational to determine how SBAE programs can continue to foster intrinsic motivation.

Differences existed based on gender for self-efficacy in the 2022 distribution, although no differences were found in the 2018 distribution. It is common among adolescents to observe higher self-efficacy in males (Chemers, et al., 2000). The fact that differences were not noted for self-efficacy at the data collection before the pandemic and males had significantly higher self-efficacy following the pandemic warrants additional examination. Were differences simply an indication of the differences in competitors from 2018 to 2022 or were there components of educational changes in the pandemic which affected female self-efficacy differently than males? More research into self-efficacy following the pandemic, especially related to personal characteristics, is warranted based on our findings.

A grade level difference existed between upper and lower classmen for locus of control in 2018. This finding supports many other researchers who note adolescents are likely to develop a more intrinsic locus of control as they near adulthood (Chung & Ding, 2002). The finding was not mirrored in the 2022 distribution, where no differences were found based on locus of control. Additional examinations of locus of control could reveal reasons why upper classmen who were freshmen and sophomores at the time of COVID-19 educational changes did not surpass their younger classmates with regard to locus of control.

When we began analyzing data across the pandemic, we were most interested to see if any differences could be found in parallel groups of students before and after the pandemic. We were unable to collect data in 2020 and 2021 as the Idaho FFA Convention was impacted by school regulations and requirements for social distancing. What we found from 2018 to 2022 were differences in three of the four noncognitive skills we investigated. The group of students who responded before the pandemic had higher grit, lower self-efficacy, and a more intrinsic locus of control than the group of students at the same event four years later.

Grit is the individual ability to manage and overcome challenges. Duckworth and Yeager (2015) notes that one of the best methods to increase grit is to work toward goals and have the opportunity to achieve them. The educational challenges posed by COVID-19 were largely out of the control of students (Gazmararian, et al., 2021). Challenges which are insurmountable are a noted deterrent to building grit (Duckworth & Yeager, 2015). Is it possible COVID-19 made students feel as though they were ill-equipped to tackle and overcome challenges? Can we increase grit in CDE/LDE competitors through post-pandemic measures to set and achieve goals? We recommend continued examination of these findings as students continue to participate in CDE/LDE events following COVID-19 educational changes.

An increased self-efficacy in students following the pandemic is one of the more interesting findings from this study. Self-efficacy is related to an internal belief that an individual can complete a task (Usher & Pajeres, 2008). General self-efficacy as measured through the instrument in this study allows respondents to note how capable they feel at completing tasks in general. An increase across the COVID-19 pandemic could indicate that students have more individual ownership of their own success as researchers have found that completing difficult tasks can help increase self-efficacy (Usher & Pajeres, 2008). Another perspective exists that the

feedback students received during the pandemic was ultimately inflated and they received higher grades for participating, which could lead them to believe that they are better at performing skills than previous groups.

The largest difference found between noncognitive skills from the 2018 distribution to the 2022 distribution occurred with locus of control. Idaho CDE/LDE competitors in 2022 had significantly more extrinsic locus of control than those in the 2018 distribution. Locus of control is the noncognitive skill most closely associated with the amount of control an individual feels they have on the activities and actions that occur in their own life (Usher & Pajeres, 2008). Multiple researchers noted the impact of pandemic educational changes on student mental health (Gazmararian, et al., 2021; Duan, et al., 2020). Many of the impacts were related to students having a lack of stability in education (Duan, et al., 2020), frequent shifts or cancellations in plans (Pokhrel & Chhetri, 2021), and decreases in opportunity due to no fault of the student (Goldberg, 2021). Potential impact items directly oppose items noted to develop an intrinsic locus of control, most notably the ability for students to have autonomy and control over the activities and decisions they make daily (Rotter, 1966).

Some experts note that the impacts of COVID-19 on education and systems are likely long-lasting (Pokhrel & Chhetri, 2021). Pandemic changes did take much choice and autonomy away from students (Pokhrel & Chhetri, 2021). Differences we found across the pandemic could be unique to this population of students, but our findings beg the question: if the changes which are found in this study are indicative of broader changes in students, what can educators do? We recommend additional research into the impact of COVID-19 changes specifically on student motivation and methods for increasing noncognitive skills within the scope of the agricultural education model.

For secondary agricultural educators, we recommend purposefully integrating activities that can increase student autonomy and choice in their educational journey. This recommendation will likely require additional professional development for teachers related to which activities and learning environment modifications can be used to help develop skills more completely. We recommend teacher educators integrate concepts related to developing noncognitive skills in students for preservice teachers. Numerous experts point to the fact that students need additional support and personal growth following the pandemic (Goldberg, 2021). Making sure teachers are prepared to give this additional support is paramount to continued student success.

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Communicating with Prospective Agricultural and Environmental Sciences Graduate Students through a Uses and Gratifications Lens

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Abstract

Universities often overlook prospective graduate students – significant contributors to research productivity – as an audience requiring strategic communication. Uses and gratifications theory posits audiences intentionally select specific communication channels to fulfill self-actualization needs and should be used when recruiting high quality graduate students. The purpose of this study was to explore how successful graduate students fulfilled self-actualization needs using specific communication channels during their graduate school recruitment processes. This qualitative study utilized semi-structured interviews with 19 graduate students from a College of Agricultural and Environmental Sciences at the University of Georgia. Deductive content analysis revealed participants’ cognitive needs were fulfilled by websites, interpersonal communication, emails, peer-reviewed journal articles, and social media. Affective needs were fulfilled by emails, in-person visits, and reputation. Personal integrative needs were fulfilled by emails, websites, direct communication, and peer-reviewed journal articles. Social integrative needs were fulfilled by personal connections, in-person visits, emails, and social media. Emails fulfilled four self-actualization needs and should be prioritized during recruitment. Websites, journal articles, and social media gave students a holistic view of university life and provided them with the confidence to explore the university further. Results additionally implied the importance of interpersonal communication and professional relationships.

Introduction

The quality of graduate education has long played a role in the rankings of U.S. universities (Wilbers & Brankovic, 2021) with graduate students making a significant contribution to scientific research publications (Black & Stephan, 2010) adding to the research prowess of their respective universities. However, prospective graduate students are an audience often overlooked when universities are strategically communicating. For students aspiring to careers in academia, the graduate experience is the first meaningful step in their academic career (Austin & Wulff, 2004, as cited by Bagdonis & Dodd, 2010). These are individuals that will one day be academic scientists responsible not only for communicating science but serving their communities through research, education and teaching at land grant universities (LGUs; Shaffer, 2012). While graduate students play a prominent role in the research productivity and ranking of their universities, there is little focus on how best to communicate with this crucial audience.

Existing literature on communication and recruitment efforts into colleges of agricultural and environmental sciences (CAESs) has largely centered around targeting undergraduate students (i.e., Baker et al., 2013; Beyl et al., 2016; Westbrook & Alston, 2007). However, universities can

have centralized, decentralized, or hybrid models for graduate education administration in which central graduate administration handles some aspects – such as overall admission requirements and awarding of scholarships – but leaves other elements to the discretion of schools or departments (Hassanein, 2020). The differences between the graduate and undergraduate recruitment process are so pronounced that in the past decade, graduate enrollment management (GEM) has emerged as a distinct field of study from enrollment management (EM), which was developed in institutions of higher education surrounding undergraduate admissions (Balayan et al., 2022). GEM seeks to support graduate students through their distinctive lifecycles from prospective recruits to alumni. The field recognizes “each institution, academic unit, department, or program has unique characteristics that must be reasonably understood and respected” (Balayan et al., 2022, p. 38). GEM acknowledges academic requirements of graduate students are more niche and program-specific than undergraduate requirements but recognizes GEM’s limitations because it often receives less support from campus leadership (Balayan et al., 2022).

In addition to the unique elements of graduate program recruitment, enrollment, and admission, prospective students also possess distinctive motivations for pursuing graduate education and research experiences (Pooock & Love, 2001; Shellhouse et al., 2020). In the natural sciences, graduate students – guided by principal investigators – undergo apprenticeships in research labs to become scientific professionals and active members of research groups (Feldman et al., 2013). Specifically, within CAESs, these apprenticeships are often made possible with funding from agricultural commodity commission groups (Lee & Dudley, 2008). Such apprenticeships allow for the sustained development of agricultural fields through academic and technical skill training (Lee & Dudley, 2008), benefitting both academia and the agriculture industry. Additionally, the guidance of their academic advisors throughout graduate education shape how students approach their future as researchers inside and outside academia (Feldman et al., 2013; Shaffer, 2012).

Given the unique experiences contained within the graduate education experience and the lack of attention to these nuances in existing literature, a study exploring the communication processes prospective students are using to seek graduate programs and the gratifications they receive from using specific communication processes is warranted. Therefore, the present study aimed to explore the communication needs of successful graduate students within a CAES and how those needs were met through communication media during the graduate school recruitment process. The study directly addressed Priority 3 of the national research agenda for the American Association for Agricultural Education (AAAE): Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century to determine effective strategies for recruiting diverse populations into agricultural and environmental sciences requires, specifically those careers requiring a graduate degree (Stripling & Ricketts, 2016).

Literature Review

Herzog’s (1940) uses and gratifications (U&G) theory was used to frame the study. Katz et al. (1974) outlined the principal U&G assumptions that viewers are directed by their goals, are active users of media, and are aware of their specific needs (Rubin, 2002). Because users are aware of their needs, they select vehicles of communication to satisfy – or gratify – those needs (Katz et al., 1973). U&G theory assumes people are aware of their needs from media and therefore examines what audiences actively choose to do with specific media (Katz et al., 1973),

namely fulfill specific self-actualization needs. To realize self-actualization needs – which may aid in their personal development – individuals do not have to depend on others but instead look to outside sources (Blumler, 1985). U&G theory posits the following five self-actualization needs related to media choice: cognitive, affective, personal integrative, social integrative, and tension release (Katz et al., 1973). Cognitive needs are associated with increasing knowledge and informational understanding. Affective needs are associated with pleasure, aesthetics, or emotions. Personal integrative needs are associated with “strengthening credibility, confidence, stability, and status” (Katz et al., 1973, p. 167). Social integrative needs are related to bolstering contact with friends, family, or others in the world. Finally, tension release needs are those associated with a desire to escape from others and the world (Katz et al., 1973).

According to Blumler (1985), self-actualization needs may be related to social characteristics and varying experiential backgrounds. Therefore, it is no surprise that various background characteristics have been used to examine the use of communication channels in a variety of contexts within graduate student recruitment, even if not specifically from a U&G lens. Institutions have utilized undergraduate research projects as a graduate recruitment method to encourage students to continue on at the institution (Colucci-Ríos & Briano, 2001; Narayanan, 1999). Notably, mentoring and direct experiences with faculty are often cited as the most influential factors in the successful recruitment students into graduate programs (Colucci-Ríos & Briano, 2001). Faculty consistently play a large role in the recruitment. The personal brand equity of academic faculty has been investigated to reveal that trust, likability, and commitment influence a competent faculty member’s brand equity (Shafaei et al., 2019). Previous studies have suggested encouraging faculty interactions and campus visits in which students get to know the culture of campus are crucial in graduate student recruitment (Poock & Love, 2001). However, the literature also revealed deeply personal demographic factors influencing choice of graduate institutions include gender, socioeconomic status, ethnicity, age, marital status, and citizenship (Lei & Chuang, 2010).

Though these personal interactions with faculty and demographics have been shown to influence institutional choice, there is limited research surrounding prospective graduate students’ use of communication tools in exploring, interacting with, and ultimately choosing an institution for graduate education and research. From a marketing perspective, universities have attempted to address complex graduate student recruitment issues by exploring innovative marketing techniques, such as inbound marketing, to recruit national and international students to higher education institutions (HEIs; Lei & Chuang, 2010). Both positive and negative electronic word-of-mouth (eWOM) marketing has been studied for its influence on brand equity for European HEIs (Carvalho et al., 2021), and Amirali and Bakken (2015) found success in implementing a social media strategy to connect, communicate, and collaborate with international graduate student recruits. While the importance of using marketing tools to successfully reach prospective graduate students is crucial to overall graduate student recruitment, specific literature surrounding the complex communication needs of graduate enrollment management is still within its developing stages and worthy of further examination (Balayan et al., 2022). Furthermore, graduate students interested in research programs have been shown to value significantly different factors when selecting a university than graduate students interested in professional programs (Chen, 2008), and there is a lack of existing literature about prospective

graduate students specifically interested in research within the agricultural and environmental sciences industry.

Purpose and Research Question

The purpose of this study was to explore how successful graduate students fulfilled self-actualization needs using specific communication channels during their graduate school recruitment processes. The study was guided by the following research question: When searching for graduate research programs, what communication channels are prospective graduate students using to fulfill self-actualization needs?

Methods

The study utilized a qualitative research design to explore graduate students' experiences with communication tools when searching for graduate programs, seeking to gain knowledge from participant experiences with phenomena and develop practices based on that knowledge (Dowling, 2007; Creswell, 2007). Employing semi-structured interviews allowed participants to share their experiences while being guided by probes contained in the interview guide that aligned with U&G theory. The interview guide was reviewed by experts in agricultural leadership, education and communication and approved by the University of Georgia Institutional Review Board (IRB; Protocol # 00004686). Additionally, throughout the interviews, participants were asked follow-up questions based upon their responses to further interpret their experiences (Seidman, 2006).

In qualitative research, researchers may possess biases based upon their own experiences and therefore must reflect upon their backgrounds through bracketing (Creswell & Poth, 2018; Farrell, 2020) to increase trustworthiness in the interpretation of the qualitative analysis. The following statements help the reader understand the authors' backgrounds and serve as a form of bracketing. The first author was a graduate student within the University of Georgia's CAES in which the interviews were conducted. As the sole interviewer and coder, the first author's interview style and interpretation of the codes may have been influenced by her personal graduate program search experience in which she was recruited to become a full-time graduate student under a faculty member after working in administrative capacity within an academic department in CAES. The second author is a professor at University of Georgia specializing in science communication. As a former graduate coordinator and advisor to 58 graduate students during her tenure, the second author considered these influences throughout the interview protocol creation, peer debriefing, and writing process.

Nineteen graduate students from the University of Georgia CAES were purposively selected to participate in the study. To identify strong graduate students within CAES, a college administrator emailed each department head requesting the names of two graduate students their faculty perceived as strong in research and academics. Because this research project was part of a larger study to identify the cultural differences that may exist in prospective graduate students' communication preferences, each department submitted the name of one international student and one domestic student. Twenty-three students were invited to participate in the interviews, and 19 accepted the invitation, representing 10 departments. Of the 19, nine were international

and 10 were domestic students. Sixteen students were currently in Ph.D. programs, and three were in masters' programs. Eight of the students were either receiving both a master's degree and doctoral degree from the same department within CAES or were in direct-to-Ph.D. programs that did not require a master's degree for admission. All interviewees were full-time graduate students receiving assistantship funding with at least some time spent on a main or satellite campus during their degree programs.

The semi-structured interviews were conducted face-to-face or over the Zoom video conferencing platform based upon the personal comfort levels associated with in-person meetings due to the COVID-19 pandemic circumstances during the 2021 fall semester and location of graduate students. The interviewer offered to drive to satellite campus locations but participants asked to be interviewed over Zoom instead. To address confidentiality and privacy concerns with interviews conducted over the internet, the participants were assured only the audio portion of the interviews would be retained, in accordance with IRB protocol.

Each interview lasted an average of 60 minutes, and students were ensured that all data would only be reported in aggregate with pseudonyms used to ensure confidentiality. For consistency in protocol across all lines of questioning, a single interviewer conducted all of the interviews. Participants were asked about their personal backgrounds – both familial and cultural – before the interviewer moved into a set of questions that asked participants to describe the communication channels they used to search for graduate programs, how they corresponded with individuals affiliated with universities, learned about research at universities, and ultimately made their decision to study at the University of Georgia. While they were not provided with a list of specific media channels, participants were welcome to ask the interviewer for clarification, which the interviewer sought to keep consistent across interviews.

After data collection was complete, audio recordings of each interview were transcribed verbatim by a third-party service and uploaded to the data analysis software MAXQDA for thematic analysis. The thematic analysis utilized a single lead coder – the first author and interviewer – to manually code all of the interview transcripts, creating and maintaining a codebook which served as an audit trail to ensure credibility and integrity (Lincoln & Guba, 1985). To establish reliability, trustworthiness of the findings, and dependability, the lead coder participated in peer debriefing with the second author whose expertise is in social science research within a science communication context (Barber & Walczak, 2009; Lincoln & Guba, 1985).

Data were analyzed using deductive content analysis which utilizes existing theoretical models to assign data categories a priori (Gale et al., 2013; Lincoln & Guba, 1985). This study utilized Katz et al.'s (1974) U&G constructs of consumers' communication channel choice to fulfill five self-actualization needs – the five of which were the themes established a priori and searched for within deductive content analysis. In advance of thematic analysis, the researcher reviewed the theoretical underpinnings of U&G theory to gain a deeper understanding of how the five self-actualization needs could be applied to graduate student communication channel choice in exploring a prospective graduate program. Upon completion of data analysis, the lead coder conducted a peer debrief with a faculty member to ensure the tenets of U&G were appropriately applied to the study. Additionally, this peer debriefing gave the lead coder and opportunity to

share the audit trail and justify the coding of communication channels into specific categories of self-actualization needs to mitigate bias and increase rigor (Lincoln & Guba, 1985). Data analysis provided rich description supporting the influence of self-actualization need fulfillment on communication channel choice.

Results

Cognitive Needs

Participants utilized a variety of communication channels to gratify their cognitive needs. The communication channels that emerged related to fulfilling cognitive needs were *websites*, *interpersonal communication*, *emails*, *peer-reviewed journal articles*, and *social media*.

First, participants indicated university, departmental, and lab *websites* helped them gain initial information about degree programs and faculty. Cognitive needs fulfilled by *websites* included gaining information about the amount of time it would take to receive a degree in the program, the courses offered, course hour requirements, and financial information, or as Kimberly called them “the practical requirements.” Karter said exploring the *websites* of different programs within a university expanded her knowledge about the possibilities to integrate with other departments when she stated, “The program of study on the website drew me to wanting to do a certificate because I saw all the options.” Faculty research specialties stated on the *website* also fulfilled cognitive needs by categorizing information about faculty research specialties and labs. Charles said *websites* with short, bold wording were most useful because “at least for the first impression, the first word or first sentence is most important.” Other participants said they delved into the lab *websites* of faculty members to learn their specific interests, current projects, publications, the type of graduate students currently working within the lab, and availability of assistantship funding. Natasha stated,

I was able to learn the most information that I could about what the lab was doing without directly communicating with a faculty member. It helped me reduce the faculty members that I reached out to or increased my want to reach out to a faculty member.

Interpersonal communication, specifically gaining information from existing connections, was the second communication channel found to fulfill cognitive needs. These *interpersonal communication* channels were not explicitly stated by the participants but were indicative of the personal connections they had that fulfilled their cognitive needs in the graduate program search. *Interpersonal communication* was identified as an acquaintance or mentor providing information to the participant about the program. In Oliver’s case he heard from a friend in an intensive English course that the department at the university was a strong one. “He told me that there are a couple of great professors in the [department] working in nutrition, immunology, microbiology, all those stuff I’m interested in,” Oliver said. Sara used the alumni networks from her previous institutions to gain information about prospective graduate schools, saying “You kind of learn from the alumni where they are right now...their current affiliations, if they were once in the same school as you are in [country], and now they are somewhere in [the] US.” Additionally, Tonya found her faculty mentors from an undergraduate institution were instrumental in giving her information about programs and prospective faculty advisors.

The third communication channel that fulfilled cognitive needs was *email*. Josh had his cognitive needs fulfilled because a mass *email* message went out to members of a professional society advertising the availability of a funded position. *Email* was used with personal or professional contacts to point participants in the right direction. Participants repeatedly mentioned *email* communications helped them narrow down where to apply based upon their correspondence with faculty members, specifically if there was funding available. Matt, an international student, said, “First, you know whether they would want new students or not because you don't want to just apply and then find out no one needs you.”

Peer-reviewed journal articles, in combination with faculty members' CVs, also fulfilled cognitive needs. Sara stated, “So the publications speak a lot about the kind of research going on in a department.” Participants used *peer-reviewed journal articles* to gain information about prospective faculty research methods and identify their research specialties. Though the departmental websites sometimes identified a faculty member in one area, further exploration of their current publications revealed they were not focusing in the exact content area that piqued the student's interest. This led participants to search elsewhere.

The final communication channel that prominently fulfilled cognitive needs was *social media*. Participants indicated *social media* helped them access current information about faculty members through platforms such as LinkedIn, Twitter, Facebook, or ResearchGate. These platforms tended to be updated more frequently than lab or departmental sites. Once participants' interests were piqued, they often chose their favorite forms of *social media* to obtain current knowledge and information about the happenings of the department or college. Yvette said, In our field, there are a few very professional platforms we can use or maybe some journal publication websites that, every once in a while, will post some information...we probably won't check those websites every day. But we definitely will use social media a couple times a day. I feel social media like Instagram, Twitter, or Facebook...it's probably an easier way to draw our attention to any potential opportunity.

Affective Needs

The communication channels that fulfilled students' affective needs were *emails*, *in-person visits*, and *reputation*. *Emails* fulfilled affective needs because participants who mentioned this need were often met with enthusiasm by their prospective faculty advisors in their *email* correspondence. Participants repeatedly mentioned faculty members responding to them quickly and with kind words building their confidence and affirming their interest. *Emails* also gave them a glimpse into the type of person their advisor would be to work with during a graduate program. Allie said,

The two professors that I'm working with ... both responded with excitement ... and even recommended I consider applying to the PhD program. So that was positive affirmation for me, that they were interested in working with me ... which was great.

Participants were especially grateful for constant *email* correspondence with advisors after their acceptance to the program, solidifying their choices to accept an offer. *Email* correspondence was additionally useful in connecting participants with current students or alumni from whom they felt they could gain a full picture of the program itself, appreciating the helpfulness of the students and their honest opinions of what working within a department may be like. Participants

also praised the staff who made their transition into graduate positions easy because of quick, enthusiastic, and helpful *email* correspondence. However, *email* also came with pitfalls. Participants emailed multiple faculty and failed to receive a response or reached out to several students with no reply. Nate emphasized this feeling.

There are several people that I would email two or three times and no response. I mean, those are some of the schools that I really was hoping to get a response from and really looking forward to attending. But once they never emailed me back or made no effort to get to know me, I was like, 'It's done. It's over with.'

In-person visits were also particularly influential in fulfilling participants' affective needs. *Visiting in-person* gave participants confidence about the faculty members' personalities. Participants emphasized the importance of building relationships during these visits, recalling they helped them envision making friends or working with faculty members. Allie discussed how the graduate student association president for the department showed her around and introduced her to various students, faculty, and staff, casually answering her questions. Beyond student greetings, Allie remembered, "The professors were very welcoming and seemed to care about me as a person, beyond just being a student in the department." Natasha chose her current program over another university stating, "The real seller was way better interactions with actual students in the program. I think they provided me with a lot more information about what it's like to be here, what it's like to interact with the faculty members."

Finally, *reputation* – of faculty, departments, or the university overall – though not necessarily a communication channel was mentioned multiple times as an influential factor fulfilling affective needs of participants and is therefore listed amidst the communication tools within this study. Some participants, like Lorelai and Charles, felt good about attending the school because of the *reputation* of their advisors – both personal and academic. Lorelai said, "Another important thing I consider is the ethical background of my PI. So just to make sure he is someone who can do research in a moral manner. I think morality is a big thing." Oliver mentioned his previous negative experiences in contributing to research projects and not receiving credit for his work in publications. He was looking for a department with a *reputation* of acknowledging academic contributions. Oliver said, "I really look for that specifically. I don't ask people directly, but you can hear that if you've been around for a long time, you can see who is giving you the most credit or who is just patting you on the back." Other participants had connections to the school and its *reputation* as an institution. Leah said, "I learned about land-grant universities and I wanted to focus on the service factor, giving back to the community."

Personal Integrative Needs

In identifying the gratifications associated with communication channels, students recognized fulfillment of personal integrative needs. Communication channels were classified as personal integrative if information found through the channel made students feel confident about the credibility and status they would receive by becoming a graduate student at the university. Communication channels identified were *email*, *websites*, *direct communication*, and *peer-reviewed journal articles*.

Email was most prominent in participant responses. Participants recalled *emails* with professors helped them feel secure about the place they would have within the research program, particularly with their research projects. Participants wanted to feel supported and know faculty research interests aligned with their personal goals. Lorelai stated,

So, I have to be 100% dedicated to this research project. I have to make sure that I'm very excited about this project and I know what to do...I actually had a lot of email exchanges between me and my PI just to figure out what kind of experiment that I'm going to do.

Similar to the affective gratifications, participants used *email* to learn about their future advisors' research ethics and, thus, the ethics associated with their future work, ensuring research methods were in alignment with their personal values. These *email* conversations with faculty helped participants determine if they would fit into a researcher's lab dynamic. Notably, participants also used *email* to correspond with staff or students within the department about the dynamics of the student experience, work out pay information, and – in the case of international students – ensure all was in order concerning their visas.

Websites were primarily used to fulfill participants' personal integrative needs by identifying faculty whose specific research interests aligned with their own. This alignment of research interests gave participants confidence in their ability to fit in with the research activities of the lab and convinced them work in the lab aligned with their career goals. Participants used *websites* to conduct searches of faculty interests, comb through CVs, and peruse current lists of faculty research articles. Karter shared,

Whenever I get to a faculty [web]page that just has a phone number I'm disappointed because I like to read what people do. I like knowing that I'm in a place where I can go have a meeting with somebody who has a specific skillset and learn from them.

Other participants were interested in faculty members' individual lab *websites* because they showed what the lab prioritized – whether it was publishing, sharing scientific information with the public, displaying student successes, or displaying innovative research equipment. Lab *websites* contributed to participants' sense of stability because they began to imagine themselves in the labs. Some participants were particularly stringent about checking the most recent publications listed on faculty lab *websites*. They were searching for advisors who were publishing actively which would give them an advantage in future job prospects. As she sifted through lab *websites*, Lorelai asked herself, “Do they have current publication years or do they only, for example, have one publication five years ago and they haven't published new things?”

Participants repeatedly cited *direct communication* as the third personal integrative communication channel. Participants did not specify the specific channels, instead focusing on descriptions of the conversations that solidified their opinions of the status and stability they would receive in a graduate program. Participants primarily found out about lab and departmental culture through *direct communication* – whether speaking with alumni, technicians working in their lab, or staff within the department. Participants appreciated honesty from their prospective advisors that happened through *direct communication*. Tonya recalled,

I felt like I could be blunt with him... I mean, he understood when I came into grad school that I was going to be uncomfortable moving away from home. I feel like I was just honest with him...He was able to give me insight into areas that I feel like I probably couldn't have gotten through digital communication.

Other participants relied upon *direct communication* with people who had attended graduate school to help them feel confident in its benefits. For example, Victoria stated she asked graduate school alumni “whether or not it was worth it to go to grad school, what skills they learned, kind of a lot of research skills and project planning time management and how that could benefit me going forward.”

Participants briefly mentioned using *peer-reviewed journal articles* to satisfy personal integrative needs. Some participants used journal articles to spark research inspiration, giving them confidence in choosing a certain faculty member or program. Lacy confessed that a large draw for her was being able to understand her prospective advisor’s academic work, increasing her personal self-efficacy to succeed. Lacy stated, “That was a part of the reason why I said yes to Dr. [Advisor] is I could read her papers and mostly understand them.” Finally, the research methodology and impact factor of *peer-reviewed journal articles* helped participants choose a program because they felt confident in the status they would receive as a researcher using reputable methods. Matt explained how *peer-reviewed journal articles* affected his evaluation by stating,

I look at the names, how many names do we have as an author? And then see how many of them are from [the] university. And I look at the materials and methods. If they really send their samples to another division or department, that's a big no for me. An institution or a department has to be self-dependent on analyzing the results of their studies.

Social Integrative Needs

Finally, participants identified communication channels that fulfilled social integrative needs. Though participants’ social integrative needs were not as common as the other needs fulfilled, they were still notable within program searches. Students identified the following communication channels that helped them strengthen “contact with family, friends, and the world” (Katz et al., 1973, p. 167): *personal connections, in-person visits, emails, and social media*.

First, participants were influenced by *direct communication*, considering not only the attitudes and friendliness of their prospective advisors, but the views of their close friends and family. Charles said, “I’m not the person who really asks to anonymously to some [online] community thing... I really consider crucially about the opinions from my close friends or my family.” Participants also valued personal interactions with faculty or staff at the university who were willing to point them in the right direction, even if they could not offer the participant an opportunity themselves. These experiences helped strengthen participants’ opinions of relationships with the university.

Students’ *in-person visits* helped them form relationships with faculty and students, thus fulfilling social integrative needs. Nate shared he formed a comfortable relationship with his advisor during the visit stating, “It seemed like he was really concerned about my education and my future rather than getting two or three years work out of me, then just pushing me out of the program.”

Emails also satisfied social integrative needs. *Email* served as a way for participants to relate to their advisors if they were located in vastly distant locations. *Emails* were especially useful for participants who did not have an opportunity to visit. Leah said, “Those email conversations are very helpful in building trust. Oh, okay, this is where I want to finish my education because those people are concerned about me, and they're willing to spend their time.”

Finally, *social media* fulfilled social integrative needs by providing a mechanism through which participants felt comfortable building relationships with current students, institutional alumni, or otherwise unapproachable faculty. LinkedIn provided opportunities to build upon professional relationships after initial contact was made through conferences or emails. International participants found other students on Facebook to build relationships with them and develop a deeper understanding of the university or departmental situation. Matt described, “I used to use Facebook ... I didn't know them before, but I added them. And then they would accept my request And it was really helpful to know how the department is, what environment the department has.”

Tension Release Needs

No communication channels emerged as fulfilling tension release needs.

Conclusions, Implications, and Recommendations

The findings indicated successful graduate students used a variety of communication channels to fulfill self-actualization needs identified by U&G theory in their searches for graduate programs in CAESs. No two students described their searches the same, but communication channels emerged in the analysis with some fulfilling multiple self-actualization needs, consistent with previous findings of U&G (Katz et al., 1973).

Emails were identified as communication channels that fulfilled four self-actualization needs. Timely responses with information about funding fulfilled cognitive needs, while enthusiastic responses stood out in the minds of sometimes discouraged graduate students to fulfill affective needs. Many participants expressed their frustration in never receiving a response from faculty members or reaching out several times before receiving a reply. Interest in pursuing graduate education would fade until a faculty member expressed excitement about corresponding implying it was this initial frustration that made the faculty communication when it came so positive and fulfilled an affective need.

Many participants chose a graduate institution far from home, and interactions with faculty over *email* increased their confidence in moving their lives across states or oceans. *Emails* ensured participants' sense of status in a program and fulfilled personal integrative needs. Though these *emails* did convey professionalism, they also formed relationships that were not associated with academia and fulfilled social needs. Participants cited *emails* as a constant line of communication in which they felt they could begin to form a relationship with their advisor. These findings aligned with previous literature indicating students prefer personal contact (Baker et al., 2013) and the involvement of faculty in recruitment efforts (Colucci-Ríos & Briano, 2001; Westbrook & Alston, 2007), especially if a faculty member seems trustworthy, likable, and committed

(Shafaei et al., 2019). The finding implies faculty seeking to recruit strong graduate students should prioritize response times and proper enthusiasm within *emails*, even if they are just forming an initial connection with a prospective student and will subsequently schedule follow-up communication. Faculty should consider creating an *email* template to quickly reply to interested graduate students, in which they can customize a response based on individual student needs – whether confirming funding interest or pointing a student in the direction of another prospective advisor.

Websites fulfilled both cognitive and personal integrative needs. Participants felt they could get to know what the departmental experience was like without directly reaching out to a source through both departmental and lab *websites*. By exploring *websites* participants began to understand the priorities of the department and specific faculty fulfilling informational needs. In addition, the participants were able to determine if they would feel a sense of belonging in the lab based upon the characteristics of the lab displayed online, thus fulfilling needs associated with stability and status. This finding implies departments and faculty members should prioritize the creation and maintenance of strong departmental and lab *websites* with rich descriptions of current research projects to attract students.

Peer-reviewed journal articles fulfilled cognitive and personal integrative needs by giving participants additional insight into faculty research focus while simultaneously indicating research caliber. When research interests and methods aligned with participants' priorities, they were more likely to reach out. However, participants struggled when stated research interests on the *websites* differed from that of the current publications, or the available faculty CVs did not contain current publications. Faculty should ensure their CVs and research interests are current in online profiles to appropriately represent their recent work. Additionally, participants felt personal integrative needs fulfilled when faculty emailed them current papers or manuscripts central to their primary research. The finding implies faculty should consider including current manuscripts into their common correspondence practices with prospective graduate students to examine alignment of student research capacities and interests with their own.

Social media was a digital tool that fulfilled both cognitive and social integrative needs. *Social media* offered a way in which participants could keep up with current events in their field and find additional information about programs once their interest was piqued – all from platforms they accessed regularly. This is in alignment with the findings of Amirali and Bakken (2015) in which connection and interactivity on *social media* increased international graduate student recruitment success. *Social media* also provided an avenue through which prospective students could connect with current students or alumni to form relationships. This finding implies departments should consider the current upkeep of departmental *social media* accounts for the benefit of incoming students, while also considering how current students' *social media* activity could affect the department overall.

Finally, the findings implied participants were heavily influenced by several types of personal communication with faculty, staff, current students, existing connections, and alumni. *Interpersonal communication, direct communication, in-person visits, and reputation* were communication channels indicative of participants' interests and desires to attend a university because of the cognitive, affective, personal integrative, and social integrative needs fulfilled by

these conversations. The repeated emergence of these channels implies the importance of maintaining relationships and connections by providing current graduate students' contact information and making prospective graduate students feel welcome and secure. Social relationships (Bagdonis & Dodd, 2010) and faculty relationships (Feldman et al., 2013; Shaffer, 2012) are instrumental in shaping students' future in academia. In a world immersed in digital communication, relationships should not be forgotten as a key driver of academic work.

Graduate student recruitment is a complex topic, made increasingly so by the nuance of departments within colleges that have their own program-specific requirements and less support from campus leadership (Balayan et al., 2022). The present study revealed successful graduate students in agricultural and environmental sciences used a combination of communication channels to satisfy their self-actualization needs throughout the graduate program search. However, one limitation of the study was its lack of segmentation between doctoral and master's students. Future research should distinguish between student degree levels and determine if communication tool use and needs satisfaction differ based upon degree level. This is pertinent given the nuances of graduate programs and their acceptance procedures that tend to vary across disciplines (Balayan et al., 2022). Future research should also focus on prospective graduate students' preferences for each channel and their use of each channel throughout the process to determine how departments and faculty within a CAES may strategically provide appropriate communication at each step of the process according to prospective graduate students' needs.

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Exploring Preservice Secondary Agricultural Educator Perceptions of Global Issues Integration into Instruction

Abstract

A call for the urgent integration of education for sustainable development has been made for every level of education by the United Nations (UN). The UN uses the Sustainable Development Goals (UNSDGs) as a tool for monitoring progress towards their 2030 agenda, there is also potential for the UNSDGs to become a valuable resource to guide instruction. Studies have looked at the effectiveness of the UNSDGs as a component of pedagogical design capacity, but studies focused on the adoption of the UNSDGs as a tool for agriculture education are scant. A baseline description of perceptions and confidence regarding the UNSDGs will help guide conversations on best practices in professional development programs and agricultural teacher education curriculum that prepares educators to enter the field equipped for global education instruction. This descriptive study of the agriculture teacher education programs in the US revealed highest awareness, importance, and implementation of global issues related to UNSDG (4): Quality Education. Significant discrepancies between importance and implementation were found in three UNSDGs including: (6) Clean Water, (11) Clean Energy, and (14) Life Under Water. These results will help inform future efforts with more attention to areas where educators have identified a need for support.

Introduction

Since 2015 with the development of the United Nations Sustainable Development Goals (UNSDGs), there has existed an urgent need to embed education for sustainable development into all levels of education (Cebrian et al., 2020). The UNSDGs are a result of collaboration across disciplines, but evidence of how best to implement them into the curriculum and instruction across disciplines, as well as literature reporting evaluation of impact because of implementation are scant. Studies (Merryfield et al., 2008; Petillion et al. 2019; Pirlet, 2021) across a few fields have been conducted to assess the effectiveness of instruction that incorporates the UNSDGs into the curriculum, yet further observations of indicators are needed to comment on long term success of implementing SDG frameworks at the secondary level. Furthermore, with the call to integrate the UNSDGs into education settings, an important question to be addressed is if there has been appropriate investment in efforts to prepare and train educators to successfully integrate the UNSDGs? Educators who are in the early stages of learning how to integrate resources with content like the UNSDGs need formal training (Cochran et al., 2020). In the agricultural education discipline, the typical offering of courses in a teacher education program include: teaching methods, program planning, student teaching, foundations of agricultural education, Supervised Agricultural Experience, Agricultural mechanics, and FFA advising (McLean & Camp, 2000). In addition to agricultural education courses, programs also require a certain number of technical courses in the modern agricultural system (Davis et al., 2007; USDA, 2011). No study currently exists that details which agricultural teacher education programs require familiarity and readiness to integrate the UNSDGs into instruction. Professional development offerings could fill in the gaps given previous work that has shown that integration by educators is impacted

significantly by professional development (Weiss & Pasley, 2006). Further studies (Borko, 2004; Snow-Gerono, 2005) have commented on the benefits of professional development aiding in delivering new ideas and pedagogy, but some (Cohen, 2001; Loucks-Horsley et al., 2003; Weiss & Pasley, 2006) note the need to study “deep level” changes in instructional practices. In addition to professional development, professional learning networks like those of National Association of Agricultural Educators (NAAE) offer both professional development and spaces for educators with familiarity of the UNSDGs to meet and interact. Given the need for high impact training to ensure quality professional educators, a study exploring the experience, current awareness, perceived importance, and willingness to integrate the UNSDGs into instruction using global issues has potential to be a powerful tool for determining the readiness and capacity for teachers to deliver on the United Nations call to action for education in sustainable development.

The research team at Penn State focused on pre-service student teacher candidates in their final year of study who will be completing a student teaching internship at some point in the following academic year to gain an understanding of the capacity of newest agricultural educators to enter the field from a university program. We recruited participants for a study as a part of a larger study including multiple populations representing different aspects of the agricultural education teacher education continuum. The primary goal for all populations was to explore the value educators place on global issues in their instruction; and thus, their interest and capacity for integration of the UNSDGs into their instructional design. An assessment of the participant perceptions of sustainable development (as defined through the lens of “global issues”) will inform the design of future professional development interventions and possibly the courses of study and curriculum that pre-service student teaching candidates will complete before stepping in the classroom. This study helps address the research priority area 7 “Addressing Complex Problems” in the most recent version of the American Association for Agricultural Education National Research Agenda (Andernoro, Baker, Stedman, & Weeks, 2015).

Review of Related Literature

Sustainable development education began prior to the development of the launch of the 2030 goals that we recognize today as the 17 Sustainable Development Goals. (Bezeljak et al., 2020). Early on Education on Sustainable Development (ESD), was carried out to equip students with the ability to apply knowledge in a variety of unpredictable situations, where practical solutions for problems were necessary (Jucker, 2001; Johnson, 1999). In 2015 United Nations member states shifted from the Millennium Development Goals (MDGs) and adopted the 2030 Agenda for Sustainable Development (2030 Agenda). Progress with implementation of the 2030 Agenda is monitored and reported by 17 interdependent thematic Sustainable Development Goals (SDGs), which have 169 specific targets and are measured through 232 indicators (Wilkinson, 2019). The United Nations have labeled this era of the UNSDGs as the Global Action Plan (GAP) to promote Education on Sustainable Development (ESD). The UNSDGs are designed to be a measuring stick for the initiative and push systems thinking to make a difference in addressing global issues (Tomja, 2018; Bebbington & Unerman, 2020).

Rivera and Dann (2011) remarked that Agriculture, Food, and Natural Resources Education (AFNRE) programs at the secondary level require teachers who are critically reflective and prepare students to be effective citizens for sustainable food and fiber production, natural resource management, and decision making that positively affects their communities. Additionally, Harris & Fuller (2014) stated that the modern agricultural teacher education program goes beyond instruction in an already multi-disciplinary field that includes topics such as archaeology, anthropology, biogeography, genetics, linguistics, and taxonomy. UNESCO (2014) reported that “Aside from learners acquiring skills and knowledge to comprehend sustainability issues, other social outcomes are also expected from education for sustainable development: it must prepare students and professionals not just to reflect about the current challenges, considering social, economic and environmental perspectives, but to make appropriate decisions and take action to address them.” (p.10). With mounting pressure on educators to appraise global competency and deliver ESD prior to GAP, the situation has only become more urgent since GAP began and the UNSDGs emerged as the preeminent tool for measuring progress towards sustainable societies (Lavanya & Saraswathi, 2014; SalÓte, 2015; Pipere et al., 2015; Heasley et al., 2020).

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To leverage the global perspective needed to address global issues with ESD, many institutions have invested in global learning courses. One such example, International Agriculture, has become a part of the curriculum of several higher education institutions. Some institutions (e.g. Cornell University, North Dakota State University, Ohio State University, the Pennsylvania State University, Oklahoma State University, and UC Davis) currently offer a form of international agriculture and development graduate degree program; with more slated to introduce similar programs as well (Cho, 2022). Agriculture is a means to grow food, generate wealth, increase employment opportunities, and develop, but beyond that, the subject becomes a player in global issues as development and the use of resources grows with the global population (Reyes, 2001; Dethier & Effenberger, 2011). Since the 1970’s, entities like the United Nations have called for teacher education programs to prepare the next generation through environmental education and ESD (UNESCO-UNEP, 1977). Teacher education programs, and agricultural teacher education programs have the capacity to develop knowledge, skills, and dispositions necessary to overcome challenges of future generations and cultivate a global perspective.

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Singmaster and Manise (2016) in a study conducted by the Asia Society and the Longview Foundation for Education in World Affairs & International Understanding found that 94% of the responding educators felt that a global perspective should be taught in agriculture classrooms. The study also showed that well over half of those teachers do not explicitly teach with a global perspective, citing that they do not have the resources to fully integrate global issues and skills into their curriculum. A study by Ayobolu (2019) found that only 49.6% of the educators participating in the survey had previous knowledge about the SDGs from a pre-test. The same respondents had an agreement level of 91.2% on the need to disseminate the SDGs. Tichnor-Wagner et al. (2019) reported that definitions for many global competency training initiatives for teachers were understood, but the knowledge, skills, and dispositions needed to do so were unclear. Finally, a study by Kahn (2013) found that while sustainability offices and programs at over 300 institutions of higher education worldwide signed on to the Talloires Declaration, a commitment made by university presidents toward sustainability, less than 30% of the Talloires Declaration universities' web

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sites in Canada, USA, United Kingdom and Australia had information on sustainability education. Given the demonstrated need, but the lack of observation, a formal study exploring the current state of ESD in agricultural education through a survey of the agricultural education continuum could help fill gaps in the literature.

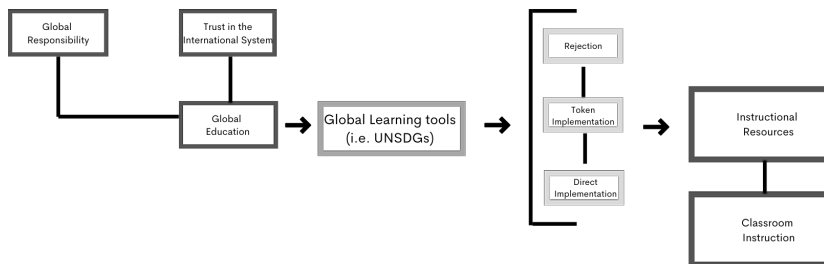
Conceptual Framework

The conceptual framework for the current study (see *Figure 1.*) is a model currently being explored for its ability to focus studies on intervention points like professional development or curriculum modification. Resources found in coursework or professional development are offered to educators to improve pedagogical design capacity (PDC) and assist in the application of instructional resources which contribute to classroom instruction. PDC is teacher's capacity to acquire and utilize resources based on the needs of their learners and the lesson (Brown, 2009; Knight-Bardsley & McNeill, 2016).

Knight-Bardsley & McNeill (2016) add that teachers use resources to support student learning and those instructional resources are a part of teaching design. Resources related to global competency that incorporate the global issues in which the UNSDGs are designed to address are presented to an educator, and according to the Continuum of Implementation (CoI) they make a decision on their use (Klein & Riordan 2009). The continuum is not a hierarchy, but rather space to move through as they acquire new knowledge and assess their comfort and success in delivery because of (but not limited to) self-efficacy, prior experience, and training. Klein & Riordan (2009) found that contrary to findings stating that educators come in at one point and apply their knowledge in more and more rigorous means (direct implementation and adaptation), they may move back and forth depending on instructional decisions and learner reception.

Teaching design as well as the teacher training interventions are needed effectively use a resource like a piece of curriculum and can be aided by authentic professional development and/or study in a degree program (Ball & Cohen, 1999). The current study is focused on global education, referred to specifically here as ESD, and the decision making that pre-service student teacher candidates are undertaking to integrate an ESD learning tool (i.e., UNSDGs) into their instruction.

Figure 1.
Global Teach Ag Network Conceptual Framework for Global Learning Instructional Design.



Note. The Conceptual Framework for the study was developed by bringing together the PDC from Brown (2009) with the CoI Klein & Riordan (2009) as a lens to inspect the effectiveness of professional development in building a CoP and teacher efficacy in the space of education for sustainable development.

Purpose and Objectives

The purpose of this study is to identify pre-service educator awareness, perceived importance, and implementation of lessons and activities based on global issues that are framed by the United Nations Sustainable Development Goals. The study is aimed at answering the following research questions:

RQ1 – What are the baseline values for awareness, perceived importance, and implementation of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame?

RQ2 – What are the mean discrepancy scores between perceived importance and current implementation of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame?

RQ3 – What are the current levels of confidence and expected amount of integration of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame

Methods

The following research methods were utilized in this descriptive study of educator perceptions.

Population

The participants (n=213) in the study were selected to be a part of the study survey frame based on (a) their enrollment in an agricultural education program at an institution in the most current National Supply and Demand Frame (Foster et al., 2022), (b) their status as a senior in their program with the intention of completing a student teacher internship in the spring of 2023 or fall of 2023, and (c) their faculty program coordinator (identified through the Supply and Demand Frame) opting into the study. Of the 107 programs in the National Supply and Demand Frame, 47 opted into the study. Of the 47 institutions, 27 had at least 1 student complete the survey. Participants ranged in age from 20 to 44 years old with an average age of 22.5 (SD=3.05). 78.9% of the participants in the study survey frame identified as female, with 19.1% male, and 2% identifying as non-binary. Diversity categories were measured using the US Census, 81% of the participants identified as White, with 10.1% Latinx/Hispanic, and 6.3% identifying as mixed (Jensen et al., 2021). Additionally, representation was achieved from all three major regions within the American Association for Agricultural Education. 80.1% of respondents indicated that they would be starting full time instruction in the fall of 2023, with the rest indicating a start date in the spring 2023. Results of the demographic questions were used to compare and draw possible connection to explain what factors might influence the perceptions educators have towards awareness, importance, and implementation of global issues as well as background experiences and confidence for integration of global issues into their instruction moving forward.

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Instrumentation

The “*Perceptions of Global Issues*” survey instrument is a researcher developed instrument grounded in existing instruments that were deemed as reliable and valid as being used on similar populations of secondary educators. The adapted instruments included the Global Perspectives Inventory (RISE, 2017), the Global Competency Measurement from Ariel Tichnor-Wagner (2019), and Global Competence Aptitude Assessment (Global Competence Associates, 2018). The final researcher developed instrument includes six parts: Global Issue Awareness, UNSDG Awareness, SDG Confidence, SDG Teaching, SDG Experience, and Demographics. Participants responded to questions on a 4-point Likert scale with Global Issue Awareness questions requiring a response between “1 – Very Little” to “4 – A lot.”

The list of global issues was guided by the United Nations Sustainable Development Goals. The list was integrated into the survey instrument by the research team and reviewed by a panel of experts including three faculty members and a graduate research associate for content validity based on its adherence to the UNSDG goals. Terms in the survey asking participants to evaluate the issues included: “Awareness” which was defined as familiarity with the issue, “importance” as value given to the issue, and “implementation” as how often each global issue has been used in the participant’s classroom. Internal validity was addressed for the study with two interventions: (1) construct validity and content validity addressed by a panel of experts (including faculty of teacher education, food security, and international development) and (2) face validity assessment through cognitive interviews with members of the representative population who were not subjects in the study. The instrument was pilot tested in previous studies with pre-service student teacher candidates

from the North Central region of AAAE . Results ($\alpha = .949$) showed a high level of internal consistency (Letot, 2022).

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Data Collection and Analysis

The program coordinators at the 47 participating institutions were each given the choice of a digital survey through Qualtrics or a print copy mailed. Participants were given a window from late September to early December to complete the survey. Participants were given a pre note, survey email, and two reminders per recommendations provided by Dillman et al (2014) in *Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method, 3rd ed.* The collected data were entered in the Statistical Package for Social Sciences (SPSS) for analysis. Prior to data analysis, the data was assessed for statistical assumptions, and data met both assumptions of dependent variable normally distributed across different levels of independent variable (skewness and kurtosis = 1.5 to -1.5, non-significant Shapiro-Wilk test, and Q-Q plots matching ideal quantiles line) and homogeneity of variance ($p > 0.05$). Despite high kurtosis values for 7 fields, the data passed the Shapiro-Wilk test with all values falling under the significance threshold ($p > 0.05$) and a normal distribution observed across all Q-Q plots.

Limitations of the Study

The results of the study are limited to the study population, and more work needs to be done on a wider scale to assess awareness of educators in other disciplines and contexts. We acknowledge that given the nature of the participant group composed of pre-service student teacher candidates whose program coordinators who opted into the study, some bias towards (a) appreciation for global issues, (b) convenience, and (c) survey fatigue may be present. Nearly 25% of the survey participants failed to complete the entire survey, which potentially may be due to fatigue or distraction during the course of an academic semester.

Results

The participants ($n=213$) who responded to the statements in the instrument provided the following information to answer the three research questions.

RQ1 – What are the baseline values for awareness, perceived importance, and implementation of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame?

Participants were asked if they had heard of the UNSDGs, 42.4% of respondents had not heard of the UNSDGs before, while 57.6% had at least either heard of them or could recall specific goals. Additionally, participants were asked if they were exposed to global issues instruction in high school. 74% of the participants indicated they had, but only 50% has discussed the UNSDGs specifically. Participants were then asked to identify their awareness of global issues, perceived importance of global issues, and current implementation of lessons and activities related to global issues (see Table 1) for 17 different global issues areas that aligned to the UNSDGs. The means for the three criterion variables (see Table 2) across the sample set ($n=168$) were (on a scale from 1-4) 2.87 (SD=.55) for

Awareness, 3.37 (SD=.50) for Importance, and 2.22 (SD=.73) for Implementation. Variability in the means for the three variables ranged from 1.60 to 3.88 (range=2.28). Further inspection of the criterion variables across each of the 17 Global Issue fields revealed moderate variance (.251 to .532) and all skewness and kurtosis values fell between +/- 3.7.

Table 1.
Participant sentiments on 17 global issues

Global Issues	Awareness			Importance			Implementation		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
1. Poverty	210	2.84	.77	194	3.24	.77	172	1.99	.98
2. Hunger	210	3.12	.77	193	3.63	.58	172	2.41	1.00
3. Health and Well-being	210	3.08	.74	193	3.54	.63	172	2.51	.98
4. Quality Education	210	3.46	.66	192	3.75	.51	172	3.00	1.03
5. Gender Equality	210	3.21	.85	192	3.45	.79	172	2.55	1.11
6. Clean Water and Sanitation	210	3.05	.81	192	3.56	.63	172	2.15	1.00
7. Clean Energy	210	2.72	.85	192	3.32	.69	172	2.02	.96
8. Decent Work and Economic Growth	210	2.78	.83	192	3.34	.68	172	2.17	.96
9. Industry, Innovation, and Infrastructure	210	2.61	.92	192	3.28	.71	172	2.05	.96
10. Reduced Inequalities	209	2.71	.89	192	3.23	.81	172	2.04	.99
11. Sustainable Cities and Communities	210	2.72	.86	192	3.34	.73	172	2.12	1.03
12. Responsible Consumption & Production	208	2.82	.87	192	3.45	.67	172	2.27	.98
13. Climate Action	208	2.81	.89	192	3.15	.88	171	2.10	.97
14. Life Below Water	208	2.55	.96	192	3.20	.82	171	1.88	1.00
15. Life on Land	208	2.96	.88	192	3.55	.64	172	2.48	1.05
16. Peace Justice, and Strong Institutions	208	2.73	.88	192	3.14	.84	171	2.03	1.01
17. Partnerships for the Goals	208	2.57	.94	192	3.19	.82	172	2.09	.98

Note: 17 global issues framed by the United Nations Sustainable Development Goals.

Table 2.
Participant Perceptions of Awareness, Importance, and Implementation.

	N	Mean	Std. Deviation	Skewness		Kurtosis	
				Statistics	Std. Error	Statistics	Std. Error
Awareness	207	2.87	.55	-.06	.17	-.07	.34
Importance	189	3.37	.50	-.78	.18	.63	.35
Implementation	171	2.22	.73	.355	.19	-.49	.37

Note. Means across the population (n=213) on all 17 Global Issues were examined to provide a broad scope for the issues but research fatigue was observed resulting lower participation after the first set of questions.

RQ2 – What are the mean discrepancy scores between perceived importance and current implementation of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame?

The mean discrepancy score was calculated by comparing the difference between perceived importance of each global issue (framed by the UNSDGs) and the implementation of each global issue. The comparison (see Table 3. below) revealed that SDG 6 “Clean Water and Sanitation” had the largest gap between importance and implementation (m=1.45, SD=1.05), followed closely by SDG 7 “Clean Energy” (m=1.36, SD=.99) and SDG 14 “Life Below Water” (m=1.35, SD=1.09). The smallest gap was found in SDG 4 “Quality Education” (m=.77, S.D.=.99).

Table 3.
Mean Discrepancy Scores for Difference between Importance and Implementation

Global Issues	N	Mean	S.D.	Maximum	Minimum
1. Poverty	172	1.29	1.07	3.00	-2.00
2. Hunger	171	1.28	.99	3.00	-1.00
3. Health and Well-being	171	1.10	1.00	3.00	-1.00
4. Quality Education	170	.77	.99	3.00	-1.00
5. Gender Equality	171	.96	1.09	3.00	-2.00
6. Clean Water and Sanitation	171	1.46	1.05	3.00	-1.00
7. Clean Energy	171	1.36	.99	3.00	-1.00
8. Decent Work and Economic Growth	171	1.22	1.03	3.00	-1.00
9. Industry, Innovation, and Infrastructure	171	1.28	1.04	3.00	-1.00
10. Reduced Inequalities	171	1.23	1.13	3.00	-1.00
11. Sustainable Cities and Communities	171	1.26	1.16	3.00	-2.00
12. Responsible Consumption & Production	171	1.25	1.05	3.00	-1.00
13. Climate Action	170	1.12	1.11	3.00	-2.00
14. Life Below Water	169	1.35	1.09	3.00	-1.00
15. Life on Land	171	1.11	1.04	3.00	-1.00
16. Peace Justice, and Strong Institutions	170	1.13	1.10	3.00	-1.00
17. Partnerships for the Goals	171	1.13	1.04	3.00	-2.00

Note. Means for each global issue were calculated using the difference between perceived importance values for each global issue and the implementation/utility for each global issue.

The survey included a question that asked respondents to identify whether they believe they needed additional professional development opportunities to integrate the United Nation's Sustainable Development Goals into their instruction. The participants responded that they did indeed need additional professional development (77.5% yes; 13.6% unsure, 8.9% no).

RQ3 – What are the current levels of confidence and expected amount of integration of lessons and activities based on global issues by participants in the pre-service student teacher candidate study survey frame

The survey concluded with a brief series of questions that asked respondents to identify their willingness to integrate global issues into the classroom, their confidence to do

so, and their belief in their background experience to do so. 52.1% of participant indicated that they are willing to integrate global issues into their instruction, while 45.6% felt unsure. Only 2.4% indicated that they were not willing to integrate global issues into their instruction. In addition to willingness, confidence and belief in experience were also assessed (see table 4. Below) using a scale of 1-4 with 1 being “not at all confident” and 4 being “very confident.”

Table 4
Confidence in the Integration of Global Issues

Statement	N	Mean	S.D.	Maximum	Minimum
“I feel that after graduation, I can integrate the UNSDGs into my instruction as a full-time educator”	170	2.44	.91	4.00	1.00
“I believe that my prior experience with UNSDGs will positively influence my ability to integrate global issues into my instruction as a full-time educator”		2.20	.98	4.00	1.00

Note. Means for each global issue were calculated using the difference between perceived importance values for each global issue and the implementation/utility for each global issue.

Discussion, Implications and Conclusions

The following conclusions and implications address each research question regarding the pre-service student teacher educators who participated in the current study to explore their perceptions of global issues integration into their instruction.

The cohort serving as the population for this study was diverse in location given participation from twenty-seven universities and four diversity categories. We did not however see a response from an individual identifying as “Black or African American” and would indicate this as a limitation to the study given the 7% of agricultural educators identifying as Black/African American (NCES, 2021). Furthermore, a large majority of the sample was female (78.8%) despite the percentage of female teachers overall in education currently sitting at 76% (NCES, 2021). This should be regarded as an additional limitation but we believe that given previous studies indicating a larger share of female to male participants (Miller et al., 2017; Poulou et al., 2018) we did not consider the results to be null and instead offer additional points of interest as future work could investigate the influence of gender on mentorship that pre-service educators receive towards diverse teaching strategies that may include global issues instruction.

Exploring the significant differences more closely within the 17 UNSDGs or “Global Issues,” relating to RQ1, SDG 4 “Quality Education” scored the highest in all three categories of awareness, importance, and integration. Given the sample’s grounding in the frame of pre-service educators, we expected a bias towards education and thereby a small, expected discrepancy between importance of global issues relating to education and the integration and implementation of quality education-related issues. Conversely, previous pilot testing led us to assume that SDG 14 “Life Under Water” would rank lowest across the board in awareness, perceived importance, and implementation. It was the lowest in awareness and implementation, but SDG 16 “Peace, Justice, and Strong Institutions” was ranked lowest in

Commented [A6]: In this section, Tie back to your study conceptual framework

Refer to it.

importance. Despite its position amongst the group as the least important, its place in implementation was not as different as SDG 6, 7, and 14 with regards to importance. Addressing RQ2, SDG 6 “Clean Water and Sanitation” had the largest mean discrepancy value, meaning that the participants regarded it as important, but have had relatively low amounts of implementation which can be summarized as “utility.” Previous work from Edwards and Briers (1998) have confirmed that while educators can be asked which areas, they believe they are in need of additional training and resources to close the gap between topics they perceive are important and topics they have integrated into their instruction and implemented in the classroom, the mean discrepancy score reveals those gaps with higher validity. Our conceptual framework outlines a path for global education (operationally referred to here as global issues addressed by the UNSDGs) to make it into the PDC of an educator requires a thoughtful assessment by the educator to determine use, rejection, or adaption. Levels of implementation reported in the survey indicate token and direct implementation. Looking at discrepancy scores adds nuance to this step and details the thought process that may influence confidence educators possess to implement, perceived utility, or needs for intervention to impact educator professional learning (Riordan et al., 2019).

Work from scholars (Capera et al., 2006; Guo et al., 2012; Miller et al., 2017) on the topic of self-efficacy relating to teacher behavior has shown a capacity for different impacts on students. Previous work has pointed to not just teacher beliefs and experience, but self-efficacy depending on certain student populations as a major factor as well (Zee et al., 2016; Poulou et al., 2018). RQ3 sought to lay the groundwork for future studies given a demonstrated capacity in pre-service candidates to want to integrate global issues into their instruction and a confidence to do so. Given that less than 3% of the sample identified an unwillingness to proceed forward with global issues instruction in the classroom as a full time educator, and a majority of the respondents identifying as slightly to fairly confident in their ability to integrate, the capacity is present and we should support those pre-service educators in their preparation through higher quality and consistent implementation of lessons grounded in global learning (Klein & Riordan 2009; Byker & Putman, 2019; Tichnor-Wagner et al., 2019).

Implications

Limitation in both scope and complexion of the study population limit broad implications of the current study, but we can suggest that given responses from twenty-seven universities across the country that demonstrate an awareness, perceived importance, and willingness to engage in global learning instruction through the integration of global issues into their instruction, a need exists to address gaps in perceived importance and integration. Large discrepancies were found in issues related to Clean Water and Sanitation, Clean Energy, and Life Below Water. Given these discrepancies, future students of the pre-service educators who will entering the classroom in 2023 may not be as well served in lessons related to aquatic science and alternative energy. While the current study does not measure competency in these topic areas, self-efficacy through willingness and confidence shows they are ready to, but gaps in implementation mean that they are potentially lacking in the experience needed to deliver a high impact level of instruction commensurate with instruction related to other topics, i.e., animal science, plant science, or agricultural

mechanics. In addition to aquatic science and alternative energy, training that includes exposure to best practices on the topics of partnerships and peace could be of benefit to novice educators. Initiatives like the Global Teach Ag Network could service these educators through professional development event and improvement of networking.

Recommendations for Future Research & Practice

More exploration into the relationship between pre-service student teacher candidates and global learning is needed to prepare students of those future teachers for a globalized world. Based on the findings we presented, we can suggest that while there seems to be a gap between importance and implementation for many specific topic areas within the global issue arena, more work should be done to investigate specific discrepancies between issues and a nuanced portrait of case-by-case challenges within the 17 global issues areas we identified using the UNSDGs. Some teachers may have implemented work in a specific area like quality education related to agriculture but may have neglected to explore and adequately prepare for conversations on education inequity abroad. Work from Kioupi & Voulvoulis (2019) remarked that the complexity of the SDGs required the development of a framework specifically designed to approach a single SDG for local use.

Future studies will benefit from continued expansion in scope, but also detailed focus on specific examples that show what educators are doing on the ground to implement ESD. Furthermore, future work should move towards drawing correlations between background experiences and increased confidence in global issue instruction. Specific global learning experience, i.e., studying abroad with a focus on education and agriculture, could lead to both increased confidence and increased capacity to continue their education through professional development opportunities. Given the majority of the study population willingness to engage in continuing professional development, we can assume that demand is present, but the willingness for training a year from now, or conflict that possess limited time versus a need for training on a specific content area may present competition that limits the impact of global learning professional development initiatives.

We suggest continued qualitative work as well that illustrates the nature of the background experiences of pre-service candidates. Responding to our survey that they completed a domestic study abroad, but during that time worked within a context that leveraged significant global competency development that was not able to be articulated through the response to that question could be a powerful tool for use in describing not only successful interventions for global competency growth, but research into the theory behind the planning and delivery of those initiatives. Regardless of methodology, gaining a better perspective for where pre-service candidates are coming from and their confidence in global issue instruction as they leave their teacher education program for the classroom to help advance the relevance of school-based agricultural education in our education systems as an effective conduit to prepare students to address significant issues found in the world.

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Fake It Till You Make It? College Students' Perceived Ability Versus Actual Ability to Identify Fake News on Agricultural Topics

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Abstract

For years, misinformation has contributed to the spread of inaccurate beliefs about the agricultural industry, giving rise to a concerning issue for agriculture: fake news. The internet and social media have created an environment where people can decide for themselves what is real and what is fake without ever fact-checking information. Little to no research has been conducted on how fake news plays a role in the agricultural industry making it difficult to understand how it may impact operations. This study sought to determine how adept college students thought they were at identifying fake news, how adept they thought their peers were, and how well they actually performed at this task. A significant difference was found in how participants viewed their own ability to identify fake news versus how they viewed the ability of others. Results also showed participants were not very adept at actually identifying fake news. Low correlations were found between their perceived versus actual ability to identify posts correctly and between their level of agricultural involvement and ability to accurately identify posts were also found. Increased media literacy and critical thinking training for students is recommended to help combat the effects of fake news of this population.

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Introduction

For years, misinformation about agriculture, agricultural practices, and agricultural products has plagued the industry and has contributed to the spread of inaccurate beliefs about agriculture (Baerg, 2018; Robinson & Ruth, 2020; Speer, 2017; Terry & Lawver, 1995). In the last two decades, there has been an onslaught of false information spread about agricultural and food systems in both mainstream and online media (Speer, 2017). Consumer beliefs in this misinformation can be difficult to correct and could lead to political, societal, and personal decisions that have the potential to have serious and lasting consequences (Baerg, 2018; Ecker et al., 2014; Lewandowsky et al., 2012).

“Agriculture determines a nation’s general welfare and standard of living” (Colbath & Morrish, 2010, p. 14). Thus, it is critically important for the public to have an accurate understanding of the industry (Colbath & Morrish, 2010); however, the average American is at least three generations removed from a direct connection to agriculture (Brain & Anderson, 2020). This lack of agricultural involvement coupled with the prevalence of misinformation and misperceptions of the industry has given rise to an even more concerning issue for agriculture: fake news. The internet and social media have created an environment where fake news can be created and shared quickly, leaving the public to decide for themselves what is real and what is fake with almost no filtering, fact-checking, or verification (Allcott & Gentzkow, 2017; Kumar

& Shah, 2018). Prior research on the phenomenon of fake news has also shown that it spreads both faster and farther than the truth on social media (Pierri & Ceri, 2019; Vosoughi et al., 2018).

Little to no research exists on how fake news plays a role in the agricultural industry making it difficult for agricultural educators, communicators, and organizations to understand how fake news may impact their operations. Scholars have called for further investigations of fake news and its impact on people, society, and the economy (Lazer et al., 2018; Lyons et al., 2021; Pierri & Ceri, 2019), and particularly on “college students and their ability to accurately identify and evaluate fake news stories, taking into consideration the predominance of social media as a primary news source” (Leeder, 2019, p. 9). This knowledge may lay a foundation for better understanding fake news and the impacts it can have allowing agricultural educators and communicators to better tailor their messages and efforts to consumers in the future.

While the existing literature on fake news in agriculture is in short supply, it does not mean the agricultural industry is not affected by it. In fact, it has been said that agriculture “was fighting fake news before we ever called it fake news,” especially in the food sector (Speer, 2017, para. 2). Some recent examples of fake news in agriculture include attempts by foreign countries to undermine and create fear about American agriculture through the spread of disinformation about GMOs and pesticides causing autism (*How the Agriculture Industry is Impacted by Disinformation*, 2018). The problem with this type of disinformation campaign is that it does not target just one company or organization, instead it attacks an entire industry and damages the reputation of all agricultural companies.

Today, it is harder than ever for agricultural scientists to reach consumers through the onslaught of information they receive every day (Fischer et al., 2020). What consumers know about agriculture comes mainly from the mass media, which they label as the least trustworthy source of information (Verbeke, 2005), meaning they are reliant on a source they admittedly consider untrustworthy for their agricultural information. An individual’s knowledge about agriculture has an impact on the way they interpret news about the industry. Increased agricultural literacy leads to a more favorable interpretation of agricultural news (Specht et al., 2014), and according to Robinson and Ruth (2020), direct engagement in agriculture is a positive predictor of trust in the industry. An individual’s connection to agriculture and how much agriculture is a part of their personal identity (Tarpley et al. 2020) may influence how susceptible they are to the effects of fake news about agriculture.

Conceptual Frameworks

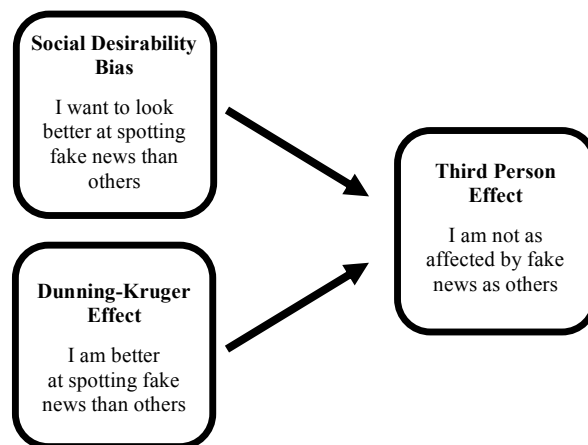
Our investigation was guided by three conceptual frameworks: *the third-person effect*, *social desirability bias*, and *the Dunning-Kruger effect*. *The third-person effect* posits that people will overestimate the influence media, including social media, has on others while underestimating the effect of the media on themselves (Davison, 1983). Social media users, in particular, believe the messages they encounter online affect others more than themselves (Zhang & Daugherty, 2009). Similarly, *social desirability bias* explains that individuals will purposefully paint themselves in a more positive light than others, particularly through “self-report measures resulting from the desire of respondents to avoid embarrassment and project a favorable image to others” (Fisher, 1993, p. 303).

While it is possible that participants would be unwilling to admit their level of susceptibility to fake news in order to look more socially desirable, what if they are simply unaware of how vulnerable they truly are? *The Dunning-Kruger effect* explains that people tend to overestimate their ability to perform tasks they are incompetent at simply because they do not know they are incompetent (Kruger & Dunning, 1999). People often see themselves and their abilities in a more favorable light than what is the reality (Kruger & Dunning, 1999) which can impact their perceptions of their information literacy, their analytical thinking abilities, and their ability to recognize their own biases (Mahmood, 2016; Pennycook et al., 2017). Lyons et al. (2021) found that three out of four Americans overestimated their ability to identify false news headlines. Similarly, Leeder (2019) noted that student self-ratings of information-seeking behaviors did not reflect their actual performance, further illustrating that students overestimate their ability to identify fake news stories.

The complexity of fake news is still being unraveled, and it is quite possible that we will never fully understand it, but by using these frameworks as a basis for our research, we can begin to put some of the pieces together. Figure 1 (below) shows the interplay of the three conceptual frameworks guiding this study. The effects of social desirability bias and the Dunning-Kruger effect may both have an impact on the third person effect, or an individual's belief that they are not as affected by fake news as others. According to Lyons et al. (2021), "understanding overconfidence may be an important step toward better understanding the public's vulnerability to false news and the steps we should take to address it" (p.7).

Figure 1

Relationship of the three conceptual frameworks of the study.



Purpose and Objectives

As fake news increases in popularity and focus, research on people's ability to identify it is still expanding. The novel nature of fake news means that researchers still do not know its exact impact on people, society, or the economy. Prior research on the topic has called for further and

more specific investigations of fake news (Lazer et al., 2018; Lyons et al., 2021). Coupled with the tendency of individuals to overestimate their ability to identify fake news stories (Leeder, 2019; Lyons et al., 2021), it seemed appropriate to look at fake news identification from an agricultural perspective in order to provide agricultural educators, communicators, and organizations with real-world knowledge of the problem and how it may affect them. With this information, the industry can better tailor their efforts to combat fake news on agricultural topics.

The purpose of this study was to determine and compare how adept college students think they are at identifying fake news, how adept they think their peers are at identifying fake news, and how well they actually perform at identifying fake news. Additionally, we investigated how college student's actual performance related to their level of agricultural involvement. The following research objectives guided this study:

- RO1:** Examine how well college students think they can identify fake news on agricultural topics vs. how well they think the average college student can
- RO2:** Explore college students' ability to identify fake vs. real news on agricultural topics
- RO3:** Determine the relationship between college students' perceived ability to identify fake news about agricultural topics on their actual performance at this task
- RO4:** Determine the relationship between college students' involvement with agriculture on their ability to identify fake news about agricultural topics

Methods/Procedures

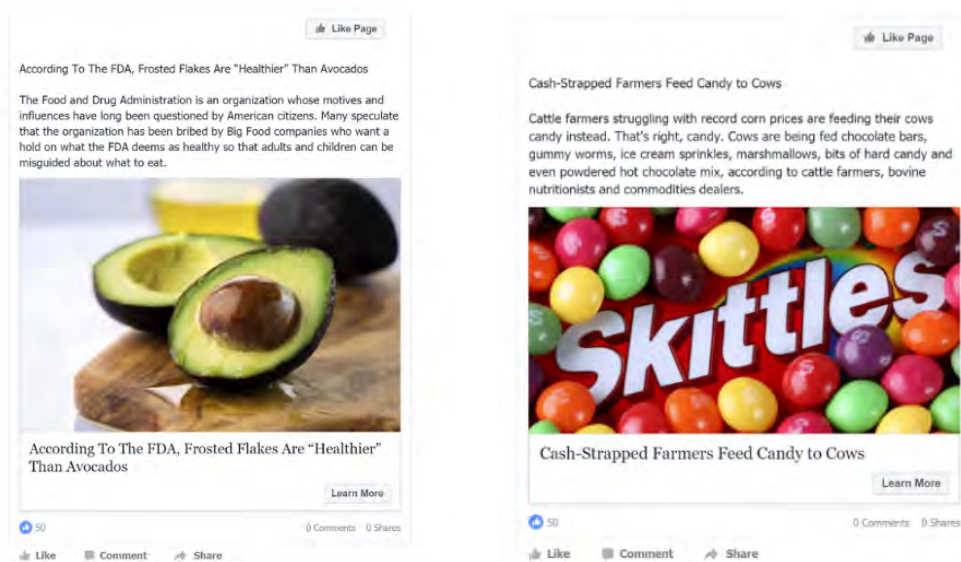
An online survey questionnaire using an embedded within-subjects experimental design was conducted to explore participants' aptitude at distinguishing between real and fake news on agricultural topics. Online survey instruments allow access to a larger, more diverse number of participants at a lower cost and are more convenient for both participants and researchers alike (Fraenkel et al., 2019; Wimmer & Domminick, 2014). Due to the presence of fake news online and the participants' abilities to respond to the questionnaire on a laptop or mobile device, we decided performing an online survey was the best way to gather a sufficient amount of data in an environment similar to where participants may actually encounter fake news. IRB approval was obtained by the researcher's institution prior to conducting this study.

Using a Qualtrics questionnaire, participants first answered four direct and four indirect questions related to their own perceived ability to identify fake news versus their perceived ability of other college students to do the same. As suggested by Lusk and Norwood (2010), the direct and indirect questioning technique can be used to gauge public opinion of a socially-charged issue in agriculture and involves asking participants about their personal opinions (direct questioning), as well as asking them what they think other people's opinions are (indirect questioning). These questions had *post hoc* reliabilities of Cronbach's $\alpha = .73$ and $\alpha = .84$ respectively. According to Wimmer and Domminick (2014), a Cronbach's α of .7 or higher is considered to be reliable.

Participants were then shown the experimental stimuli: 10 mock social media posts (see examples below in Figure 2) that included a picture, a short sample of body text, and a headline. News articles related to agricultural topics were found and verified as true or false on Snopes.com, a popular fact-checking site used by prior researchers for similar purposes (Pennycook & Rand, 2020), and reputable agricultural journalism websites (agdaily.com and pigprogress.net). Likes, comments, and shares were consistent across all posts, and the researchers removed the information's source to minimize bias as was suggested by Go et al. (2014), Pennycook and Rand (2020), and Wallace et al. (2020). The stimuli included five fake and five real news articles covering a variety of agricultural and natural resource topics that were randomized to protect from any possible order effects (Thorson et al., 2012). Participants were shown the 10 mock social media posts one at a time.

Figure 2

Examples of mock social media posts provided to participants (left: fake news; right: real news).



Immediately after the participants were exposed to each stimulus, participants were asked to identify if they believed each of the posts contained fake or real news (1 = Fake, 2 = Real) and the level to which they believed the posts were fake (1 = *completely fake* to 5 = *completely real*). Next, the participants were then presented with an 11-questions scale to measure their level of agricultural involvement. Based on previous research (Tarpley et al., 2017) with a post hoc reliability of Cronbach's $\alpha = .96$, this scale was used to measure how connected the participants were to agriculture and how much agriculture was a part of their personal identity (Tarpley et al. 2020) to determine if a connection existed between an individual's agricultural involvement and how well they could identify agricultural fake news. Finally, participants were asked to respond to a set of demographic questions.

Participants were purposively sampled from the population of undergraduate students at Texas Tech University due to their demographics' statistically high use of social media and the university's close proximity to and influence from agriculture in the surrounding community. Participants were recruited through an online research participant pool within Texas Tech University and were awarded course credit or extra credit for their participation. A total of 377 complete and usable responses were collected and analyzed; however, participants were allowed to skip any questions they were not comfortable answering, so not all 377 participants completed all 10 identification tasks in the instrument.

Data were analyzed using IBM's SPSS 26. Descriptive statistics and frequencies were calculated for all data. A paired samples t-test was conducted to determine if significant differences existed between direct and indirect question responses of the participants. Correlational tests were used to explore possible relationships between participants' direct scores and their performance on correctly identifying the stimuli as well as the participants' responses to the agricultural involvement scale and their performance on stimuli identification.

Internal validity for this questionnaire was ensured in a variety of manners. A pre-existing instrument with established reliability and validity was used for the agricultural involvement scale. For all other scales, the adapted questions were screened by a panel of experts in the fields of agricultural communications and mass communications research. The researcher developed direct and indirect question scales were also based on a prior instrument used by Lusk and Norwood (2010) with established reliability and validity. Further validity was ensured for all areas of the questionnaire by performing a pilot test prior to data collection and using the results of the pilot test to better structure the questionnaire.

Results/Findings

RO1: Examine How Well College Students Think They Can Identify Fake News on Agricultural Topics vs. How Well They Think the Average College Student Can

Objective 1 sought to examine how well participants thought they could identify fake news on agricultural topics versus how well they thought the average college student could. Overall, most participants felt confident in their own perceived ability to identify fake news as shown in Figure 3 and Table 1 below ($M = 3.92$, $SD = .74$). Their responses indicated they mostly agreed or strongly agreed with each of the four direct statements.

Figure 3

Frequency of participant responses to direct questions

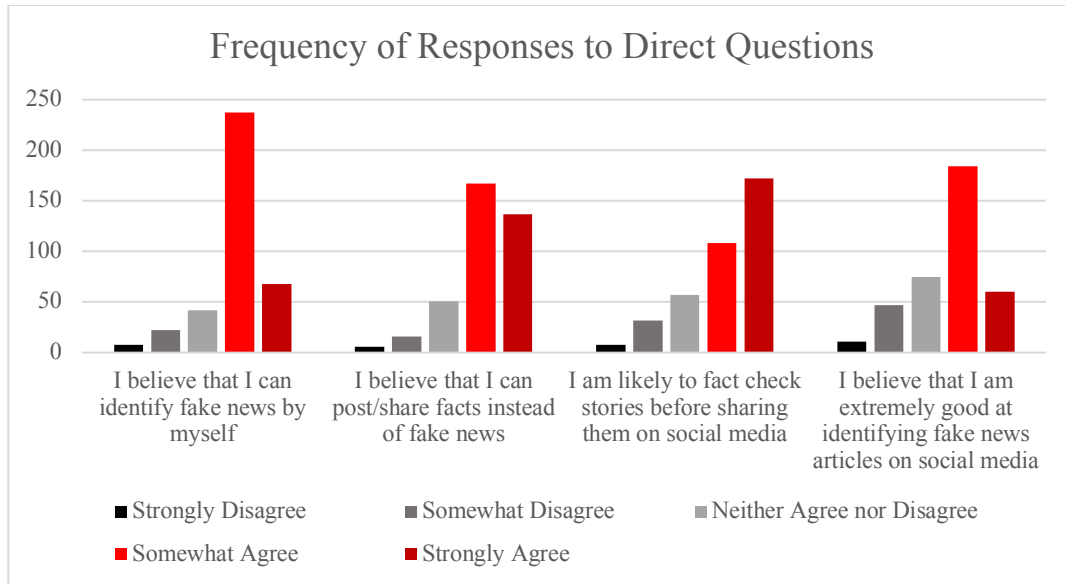


Table 1

Participant Answers to Direct Questions (N = 377)

Characteristic	<i>M</i>	<i>Md</i>	<i>SD</i>	Mode
I believe that I can identify fake news by myself	3.89	4.00	.84	4
I believe that I can post/share facts instead of fake news	4.10	4.00	.90	4
I am likely to fact check stories before sharing them on social media	4.07	4.00	1.07	5
I believe that I am extremely good at identifying fake news articles on social media	3.62	4.00	.99	4
Grand Mean	3.92		.74	

Note. Coding: *strongly disagree* = 1, *strongly agree* = 5

However, participants were not as confident in the ability of their peers as shown in Figure 4 and Table 2 below ($M = 2.63$, $SD = .81$). Their responses indicated they mostly disagreed or strongly disagreed with each of the four indirect statements provided.

Figure 4

Frequency of participant responses to indirect questions

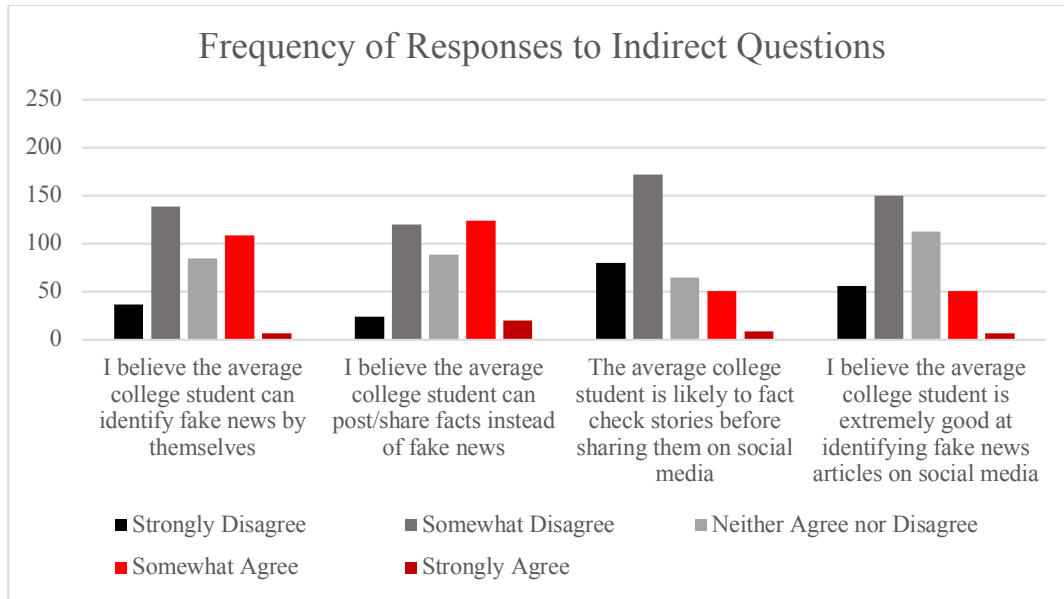


Table 2

Participant Answers to Indirect Questions (N = 377)

Characteristic	<i>M</i>	<i>Md</i>	<i>SD</i>	Mode
I believe the average college student can identify fake news by themselves	2.76	3.00	1.04	2
I believe the average college student can post/share facts instead of fake news	2.99	3.00	1.06	4
The average college student is likely to fact check stories before sharing them on social media	2.30	2.00	1.03	2
I believe the average college student is extremely good at identifying fake news articles on social media	2.48	2.00	.97	2
Grand Mean	2.63		.81	

Note. Coding: *strongly disagree* = 1, *strongly agree* = 5

A significant difference ($p < .01$) was found between participants' beliefs about their own ability to identify fake news and their beliefs of others' ability to do the same, $t(376) = 24.82$, $p < .01$, Cohen's $d = 1.65$ (see Table 3). The Cohen's d indicated a large effect (Cohen, 1988) between participants' perceived ability to identify fake news versus their views about the abilities of other students.

Table 3

Paired Samples t-test for Direct Score Average by Indirect Score Average (N=377)

Comparison	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
Direct Average	3.92	.74	24.82	376	<.01*	1.65
Indirect Average	2.63	.81				

* $p < .05$

RO2: Explore College Students' Ability to Identify Fake vs. Real News on Agricultural Topics

Objective 2 sought to explore how well participants could actually distinguish between fake and real agricultural news. The real news article most correctly identified by participants was about feeding cattle seaweed to reduce emissions ($n = 269$; 71.4%), and the fake news article most correctly identified by participants was about autism being linked to pesticide use ($n = 303$; 80.4%). The real news article most incorrectly identified by participants was about farmers feeding candy to cows ($n = 335$; 88.9%), and the fake news article most incorrectly identified by participants was about a turkey farm contaminated with Ebola ($n = 186$; 49.3%). See Table 4 below.

Table 4

Frequencies of Correct and Incorrect Identifications of Mock Posts

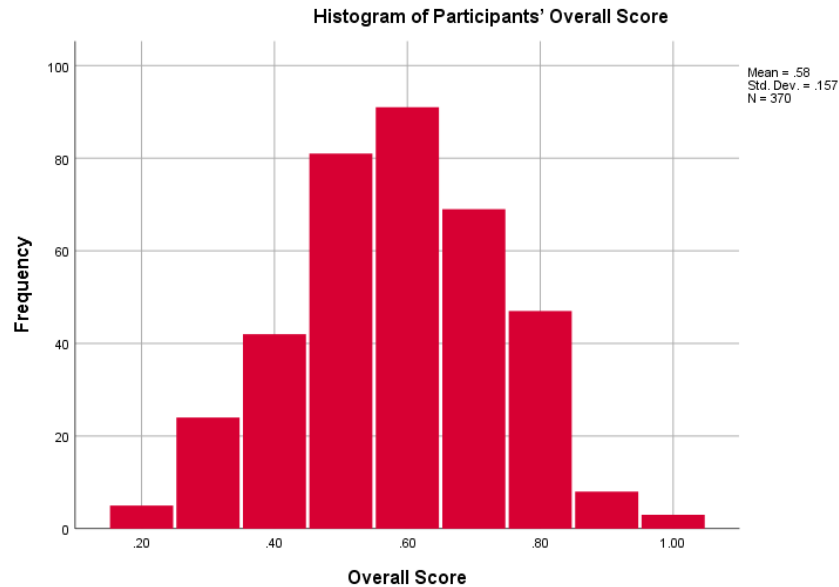
Variable	<i>n</i>	Correct (<i>f</i>)	Correct (%)	Incorrect (<i>f</i>)	Incorrect (%)
Real					
Feeding cattle seaweed may reduce emissions	376	269	71.5	107	28.5
CRISPR is used to alter corn's kernel sizes	376	264	70.2	112	29.8
Genetically engineered bull calf	375	206	54.9	169	45.1
Pigs are the latest GMO animal approved by FDA	376	174	46.3	202	53.7
Cash-strapped farmers feed candy to cows	377	42	11.1	335	88.9
Fake					
Autism linked to pesticide use	375	303	80.8	72	19.2
Frosted Flakes are healthier than avocados	377	300	79.6	77	20.4
The real reason wheat is toxic (it's not the gluten)	375	243	64.8	132	35.2
First confirmed death caused by GMOs	376	198	52.7	178	47.3
Turkey farm contaminated with Ebola	375	189	50.4	186	49.6

Overall, participants correctly identified real news posts less frequently (50.66%) than the fake news posts (65.42%). Of the 10 mock posts, they were able to correctly identify an average of 58.43% ($M = .58$, $SD = .157$) of the posts, or almost six out of 10 posts, as shown in Figure 5 below (.00 = no posts correctly identified and 1.00 = all posts correctly identified). Scores ranged

from as few as two out of 10 posts (.20) correctly identified to as high as all 10 posts (1.00) correctly identified by participants.

Figure 5

Histogram of participants' overall score



RO3: Determine the Relationship Between College Students' Perceived Ability to Identify Fake News About Agricultural Topics on Their Actual Performance at This Task

Objective 3 sought to determine if a relationship existed between participants' answers to the direct questions related to their own ability to identify fake news and their actual performance at this task. Using a Pearson Product-Moment correlation with an *a priori* alpha level of .05, a correlation of .12 was found between participants' perceived ability to identify fake news themselves and their actual performance at this task (see Table 5). According to Davis (1971), this exhibited a low association between these variables ($r = .12, p = .02$), indicating that as participants' scores on the direct questions increased, their scores on the post identification only increased slightly.

Table 5

Pearson Product-Moment Correlations Between Actual Post Identification Score and Direct Score

Variable	1	2	<i>p</i>
1. Overall Score	-	.12	.02*
2. Direct Average		-	

* $p < .05, r = .12$

RO4: Determine the Relationship Between College Students’ Involvement with Agriculture on Their Ability to Identify Fake News about Agricultural Topics

Objective 4 sought to determine if a relationship existed between participants’ involvement with agriculture and their performance in identifying fake news articles about the industry. Using a Pearson Product-Moment correlation with an *a priori* alpha level of .05, a correlation of .12 was found between participants’ involvement with agriculture and their ability to identify fake news about agriculture (see Table 6). Again, this showed a low association ($r = .12, p = .02$) as described by Davis (1971), indicating that higher levels of agricultural involvement only slightly increased participants’ post identification ability.

Table 6

Pearson Product-Moment Correlations Between Actual Post Identification Score and Agricultural Involvement

Variable	1	2	P
1. Overall Score	-	.12	.02*
2. Agricultural Involvement		-	

* $p < .05, r = .12$

A median split was also conducted using agricultural involvement scores where the median score was 2.09. All participant scores that were 2.09 or below were classified as low agricultural involvement ($n = 182$), and all scores higher than 2.09 were classified as high agricultural involvement ($n = 195$). Using an independent samples t-test of this split data with an *a priori* alpha level of .05, no significant difference was found ($p = .91$) between participants with a high level of agricultural involvement ($M = .59, SD = .16$) and those with a low level of agricultural involvement ($M = .58, SD = .16$) on their ability to identify agricultural fake news $t(368) = -.12, p = .91, Cohen’s d = -0.39$ (see Table 7).

Table 7

Independent Samples t-test for Median Split of Agricultural Involvement

Comparison	n	M	SD	t	df	p	Cohen’s d
High agricultural involvement	195	.59	.16	-.12	368	.91	-0.39
Low agricultural involvement	182	.58	.16				

Conclusions/ Implications/Recommendations

Findings from this study show participants consistently believed they would perform well at identifying fake news while their peers would not, which is in line with previous research (Leeder, 2019; Lyons et al.,2021) and our conceptual frameworks (Davison, 1983, Fisher, 1993, Kruger & Dunning, 1999). If college students believe they are already good at identifying fake news, they may not be putting much effort into verifying information because they already believe they know what is real. If this is the case, fake news has the potential to be a much larger problem than expected. Without diligent fact-checking and verification, consumers could be believing false information about agriculture that changes their purchasing habits and voting

behaviors (Terry & Lawver, 1995). Once exposed to fake news, it becomes almost impossible to correct (Del Vicario et al., 2016), making our job as agricultural educators and communicators much harder and illustrating the importance of getting ahead of fake news rather than solely reacting to it if we want to avoid the political and financial consequences of consumers making decisions based on fake news.

The large effect size found between participants' perceptions of their own ability to identify fake news and the ability of others was a bit surprising, despite being in line with the third-person effect (Davison, 1983) and the Dunning-Kruger effect (Kruger & Dunning, 1999). These results illustrate how strong of a difference there is in how we see ourselves in relation to others in regard to fake news susceptibility. As communicators and educators, this overconfidence in ability to identify fake news is concerning. In an online environment where fake news spreads faster than truth (Pierri & Ceri, 2019) and college students believe they are better than they actually are at accurately judging the credibility of information (El Rayess et al., 2018; Loertscher, 2017), we must find a way to address this problem if we want a more agricultural literate and informed public opinion that is based on fact and not rumor or intentionally false information.

Participants in this study were not well adept at identifying fake news, particularly compared to their belief in their ability to do so. In fact, if this assessment were categorized with a letter grade, almost half of the participants would have received an F. While our results were in line with findings from previous research (El Rayess et al., 2018; Leeder, 2019), it is still concerning. Given the rise of erroneous self-confidence and a lack of agricultural involvement, coupled with growing separation from agriculture (Brain & Anderson, 2020), increased skepticism from consumers (Colbath & Morrish, 2010; Nordstrom et al., 2000), and the apparent believability of fake news on agricultural topics, the industry is facing an almost overwhelming challenge. How do we begin to combat false information that has so quickly taken hold of the online world? This task rests in the hands of agricultural educators and communicators who are responsible for educating the public about agriculture and dispelling false information.

The low-strength correlation found between participants' scores on the direct questions and their actual ability to identify fake news also poses some areas of concern. Similar to the findings of Leeder (2019) and Lyons et al. (2021), these participants seemed to be overconfident in their ability to identify fake news, which could lead to a belief in incorrect information that affects everything from purchasing habits to personal safety to political decisions. This could lead to potentially dangerous results for the agricultural industry (Baerg, 2018; Ecker et al., 2014; Lewandowsky et al., 2012). If fake news impedes our ability to provide life-sustaining goods to the world, it has gone beyond just an internet or social media problem and has become realistically harmful. Because they are not currently proficient at identifying fake news, proper techniques for evaluating news and fact-checking could be beneficial to include in curriculum at multiple levels, as it is evident that college students are lacking in this area from our results, as well as the results of Leeder (2019) and El Rayess et al. (2018). For educators, regardless of discipline, adding general media and information literacy skills to curriculum could begin to improve student's fake news identification skills. If students are better equipped to identify fake news, they will be more prepared to navigate our online world and make sense of the myriad of information they see.

Other concerns arose from the low-strength correlation found between participants' level of agricultural involvement and their ability to identify fake news. If fake news can mislead even those with a stronger connection to agriculture, how can we expect individuals without experience or connection to know what is fake and what is real? These results further illustrate the risks that fake news about agriculture poses to the general population. College students, even those more connected to agriculture, are not adequately equipped to judge the agricultural information they see online. For agricultural educators and communicators, perhaps more focus should be given to agricultural information literacy both in and out of the classroom to combat this misinformation problem. Agricultural literacy and agricultural involvement have been shown to cause better interpretations of agricultural news (Robinson & Ruth, 2020; Specht et al., 2014), so it should continue to be the goal of agricultural educators and communicators to improve upon the agricultural knowledge of both students and the public in an effort to combat fake news about the industry.

Many recommendations can be made based on this research. Practitioners and educators should take care to create content that aligns with what consumers and students deem credible and trustworthy. Attention should also be given to not just agricultural literacy for students, but also critical skill development to help students better evaluate the information they consume. Further research on this topic is also essential for a better understanding and grasp of the work we must do to combat fake news. Expanding the scope of this work, replicating it with larger and more diverse audiences, exploring the agricultural topics commonly seen in fake news posts, and investigating in-depth the elements of a message that cause students to judge a post as real versus fake are just a few first steps in the right direction. Additionally, research on an individual's self-confidence to perform a task versus their actual ability could shed light on important factors that may further unlock our potential to combat fake news and protect our industry.

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They don't know Diddly Squat: The influence of *Clarkson's Farm* on college students' knowledge and perceptions of agriculture

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Documentary television series Clarkson's Farm has been lauded for its positive, entertaining depiction of British agriculture. Airing in 240 countries, the program follows British TV presenter Jeremy Clarkson in his attempts to manage his operation with the help of more experienced farmhands. Researchers at a U.S. land-grant institution, curious about the implications of screening the show for audiences with varying degrees of agricultural knowledge, analyzed students' written responses to two episodes using a conceptual framework comprising the Differential Susceptibility to Media Effects Model and agricultural literacy. We found that all students enjoyed the program, but less agriculturally literate students gained a greater appreciation for and understanding of agricultural practices, while their counterparts related to the content themselves and identified it as an example of a positive depiction of agriculture that could be used to educate others. We offer recommendations for implementing Clarkson's Farm as an educational tool and for further exploration of its potential future impact on agricultural literacy.

Introduction

The documentary series *Clarkson's Farm* portrays Jeremy Clarkson, a British broadcaster and journalist, experiencing the first year managing his farm in the rural Cotswolds' region of England (*Prime Video*, 2021; Whitehead, 2021). The first season premiered on the Amazon Prime streaming service in June 2021 (Whitehead, 2021), with eight episodes featuring topics like farm management, livestock production, agricultural business and marketing, and conservation. Each episode follows Clarkson as he attempts new tasks on his Diddly Squat Farm, such as purchasing new tractors, planting crops, and introducing a flock of sheep to his operation. Clarkson is aided by more experienced helpers, whose advice he often ignores to great comedic effect.

The show aired in 240 countries and territories (*Prime Video*, 2021), and a second season was confirmed a month after the first aired (*Amazon Studios*, 2021). In early 2023, the first season has a 100% "Fresh" rating among television critics on review aggregator Rotten Tomatoes, with a 97% "Fresh" rating among audiences (Rotten Tomatoes, n.d.). Clarkson and his colleagues also received accolades from several British agricultural organizations and ministers for the show's positive portrayal of agriculture (Murray, 2021).

Entertainment media, including films, television programs, and documentaries, have been a rich vein to mine for agricultural-communications and -education scholarship. In recent years, researchers have analyzed television programs like *The Bachelor* and *The Simple Life* to better understand their portrayals of agriculture and rural life and the potential impacts of those

portrayals on audience perceptions (Specht & Beam, 2015; Ruth et al., 2005). These studies demonstrated that entertainment media, even those falling under the “reality TV” category, often peddle in negative stereotypes and depict farming as easy, often disgusting, and menial. Most worrisome is the fact that low rates of agricultural literacy, or “knowledge and awareness of the U.S. food and fiber industry” (Specht et al., 2014, p. 64), may exacerbate the effects of negative depictions of farms and farmers.

Much has been written about the steady decline of rural and agricultural populations in the United States (Cromartie, 2017; Dempsey, 2017) and the subsequent need to inform or educate the general populace about farming (Clemons et al., 2018; Chapman & Lindner, 2018; Enns et al., 2016; Mercier, 2015; Doerfert, 2003; Frick et al., 1994). The purpose of this study, therefore, was to explore the application of *Clarkson’s Farm*, which depicts agriculture through a constructive lens, in a postsecondary classroom setting. The following research question guided our investigation:

RQ1: What influence might *Clarkson’s Farm* have on agricultural and non-agricultural audience’s perceptions and knowledge of agriculture and food production?

Literature Review and Conceptual Framework

Media Effects and the DSMM

Communications scholars have long posited that media—everything from news to entertainment—impact the attitudes, beliefs, and subsequent behaviors of audiences (Livingstone, 1998). Researchers have proposed numerous media-effects models and theories since the “magic-bullet” theory of powerful, direct media influence was largely debunked by Paul Lazarsfeld and colleagues in the 1940s (Griffin et al., 2018; Lazarsfeld et al., 1944). We looked to the Differential Susceptibility to Media Effects Model (DSMM) (Valkenburg & Peter, 2013) to undergird this study.

In their 2013 article introducing the DSMM, Valkenburg and Peter (2013) note that media effects research traditionally includes, to varying degrees, both media-related variables, such as media use and media processing, and nonmedia variables, like individual-difference variables and social context. The DSMM is a microlevel effects model, meaning it “bases [its] inferences on observations of the individual media user” (p. 222). The model is based on four propositions:

Proposition 1: Media effects are conditional; they depend on three types of differential-susceptibility variables: dispositional, developmental, and social.

Proposition 2: Media effects are indirect; three media response states mediate the relationship between media use and media effects.

Proposition 3: The differential-susceptibility variables have two roles; they act as predictors of media use and as moderators of the effect of media use on media response states.

Proposition 4: Media effects are transactional; they not only influence media use, but also the media response states, and differential-susceptibility variables.

This study focuses on Proposition 1, the conditionality of media effects. Media-effects scholars posit that audience’s interpretations of media may be based on individual characteristics such as gender, class, race, and age (Kim, 2004; Livingstone, 1998).

Valkenburg and Peter (2013) further elaborate on this notion with three types of variables that can influence audience responses. They describe dispositional susceptibility variables as “all person dimensions that predispose the selection of and responsiveness to media, including gender, temperament, personality, cognitions [e.g., scripts and schemata], values, attitudes, beliefs, motivations, and moods” (p. 226). Developmental susceptibility is an individual’s responsiveness to media based on their cognitive, emotional, and social development, while social susceptibility variables are “all social-context factors that can influence an individual’s selective use of and responsiveness to media,” ranging from their peer groups and families to their cultural norms and values (p. 227).

Researchers have utilized the DSMM to study the differential effects of playing augmented-reality video game *Pokémon Go* on individuals with varying degrees of social anxiety (Bonus et al., 2018), as well as the susceptibility to flat-earth conspiracy theories among YouTube viewers who spend different amounts of time on the platform (Landrum et al., 2021). Our analysis of written responses to *Clarkson’s Farm* considered dispositional and social susceptibility variables as described by the participants.

Agricultural Literacy

In this study, we identified agricultural literacy as the primary dispositional-susceptibility variable. Agricultural literacy, broadly, is “a short-hand way to describe the state of knowledge about agriculture among the nonfarming population in the U.S.” (Enns et al., 2016, p. 14; Mercier, 2015). Frick et al. (1991) offered perhaps the most comprehensive definition, describing agricultural literacy as “possessing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture,” with that “basic information” including plant and animal production; the economic, environmental, and societal impacts of agriculture; public policy; and the distribution of agricultural products (p. 52).

One’s agricultural literacy, like the effects of media consumption, may be based on a variety of factors at the individual and societal levels: “A person’s geographic location, occupation, political ideology, family background, education, and experiences would influence how he/she conceptualizes agriculture” (Enns et al., 2016, pp. 14-15; Anderson et al., 2014; Specht et al., 2014).

Methods

“Qualitative approaches...seek to arrive at an understanding of a particular phenomenon from the perspective of those experiencing it” (Vaismoradi et al., 2013, p. 398), and this study is a qualitative case study of undergraduate students’ written responses to entertainment media about agriculture.

Sampling

The population of interest comprised undergraduate students at The Ohio State University who were enrolled in a second-level writing course focused on contemporary agricultural issues in society. At the time of data collection, the course was open to any undergraduate student—freshman through senior in any major—who had completed their first-level writing course in the

current general education curriculum. The course helps students develop a critical understanding of agricultural, environmental, and related issues facing the United States and the world while improving their writing skills. Issues are introduced and discussed throughout the semester, and writing assignments are connected to the content covered. In the spring and autumn of 2022, 96 total students were enrolled in the course and were thus included in the sampling frame for the study.

Data Collection

The *Clarkson's Farm* activity was a two-part lesson that incorporated current issues, personal reflections, and class discussions. In class, students were shown the first episode of *Clarkson's Farm*, "Tractoring," in which "Jeremy Clarkson embarks on his path towards muddy misery and potential ruin by running his own farm" (*Prime Video*, 2021). They were immediately asked to write a one-page reflection answering the following questions:

- What did you enjoy about the show? What did you dislike?
- What did you learn about food, agriculture, natural resources, or environmental sciences from the show?
- What did you learn about rural England?

Students were given the remainder of the class time to complete and submit their reflections via the course LMS page. The following class periods were used for class discussions about the episode they had watched and their answers to these reflection questions. This process was then repeated the next week with episode two, "Sheeping," wherein "Jeremy decides to get a flock of sheep, not realising the added complications these high-maintenance animals will bring" (*Prime Video*, 2021).

We received IRB approval to access the students' responses for analysis as educational data. The course instructor, who is a member of the research team, downloaded the submissions, reformatted every pair of responses into a single Microsoft Word document for each respondent, and removed all identifying information, such as names and class sections, after giving the respondent a code number. These code numbers and the respondents' colleges of enrollment were kept in a separate Microsoft Excel document for reference. Students were removed from the study if they failed to submit one or both assignments used for this analysis, resulting in a total of 84 participants.

Data Analysis and Triangulation Procedures

The research team consisted of four investigators: two faculty members and two graduate assistants. We divided into two pairs consisting of one faculty member and one graduate student. One pair was assigned responses from students in the College of Food, Agricultural, and Environmental Sciences (CFAES) ($n=36$), and one pair to students outside CFAES ($n=48$). All members of the research team watched the *Clarkson's Farm* episodes screened during the classroom activities before data analysis began to provide additional context to the participants' written responses. Each pair coded 10% of responses in their category together ($n=5$ for the non-agricultural participants; $n=4$ for the agricultural participants) to establish initial codes and potential emerging themes, then completed the rest individually. The pairs met again to decide their codes and overarching themes, and the entire team came together to discuss their findings and draw comparisons.

In qualitative research, triangulation is the use of multiple methods or data sources to develop a comprehensive understanding of phenomena and to test validity through the convergence of multiple strands of data (Patton, 1999). We used three data sources: the participants' written responses, the two episodes of *Clarkson's Farm* shown in the classroom, and the individual audit trails kept by the research team as we coded that were used for reference when we finalized the codes and themes (Nowell et al., 2017). All research team members also reflected on their respective experiences that could influence their analysis, including their varying firsthand knowledge of food and fiber production, their positionality as researchers, students, and faculty members in a college of agriculture, and their familiarity with British culture, agriculture, and public figures like Jeremy Clarkson.

Findings

Throughout the analysis of the student reflections, six themes emerged: *humor*; *educational value*; *surprise*; *realism*; *emotion*; and *comparing U.S. to U.K.* The theme *realism* included four sub-themes: *accurate and authentic portrayal*; *mistakes*; *missing pieces*; and *unrealistic situations*. These findings highlight the thinking of students as they watched *Clarkson's Farm*, with recognition of the similarities and differences of CFAES and non-CFAES students.

Humor

Overall, the non-CFAES audience came into this experience with “no prior farming knowledge” (Student 4), and little interest in agriculture as a topic: “... I thought [*Clarkson's Farm*] was going to be a boring TV show, one that I thought was easily going to lose my interest and even lead me to sleep” (Student 9).

After the first episode, however, non-CFAES students expressed their enjoyment of the show's format: “After watching one full episode though, it has my attention” (Student 9). Student 5 said, “It adds humor, education, and intrigue behind the practice of managing a farm. I think the show managed to do a fantastic job of making it both entertaining and informative.”

CFAES students found *Clarkson's Farm* to be “funny and enjoyable to watch” (Student 53). Students voiced their concerns about the potential for the show to be a boring documentary but were happy to find the show amusing and entertaining: “Jeremy Clarkson makes it very fun to watch since he brings humor to everything” (Student 69).

Students had mixed reactions to Clarkson himself. Several students reported having some background knowledge of or previous experience with Clarkson: “I watched *Top Gear* a lot in my early 20's and enjoyed Jeremy Clarkson as the host of that show. So, seeing him in another show about farming was a pleasant surprise” (Student 71). Many believed Clarkson to be a positive element of the show and believed his “humor and personality bring a lot of life to the show” (Student 57). “Jeremy Clarkson is also one of my favorite people to watch on TV because of his great humor and oftentimes overconfident attitude,” wrote Student 69. However, a group of students also found Clarkson to be “a little annoying and ‘extra’ so to say” (Student 25), as well as “ignorant and privileged” (Student 2). While this did not completely detract from

students' enjoyment of the episodes, they were clear in their dislike of some of the show's humor.

Educational Value

Though the depth of prior agriculture experience varied, all students found educational value in these first two episodes of *Clarkson's Farm*. Students stated learning more about new agriculture practices and gaining a better understanding of the agriculture in different countries. They were able to discuss demonstrated agricultural practices with fluency, recalling terms and practices beyond a surface level understanding. However, the nature of learning varied between the non-CFAES and CFAES students.

Most CFAES students study some area of agriculture, environmental sciences, or natural resources, and therefore came into the experience with a greater understanding of agricultural practices. However, these students still gained knowledge about agriculture from watching *Clarkson's Farm*: "I learned that farming life is much more difficult and complicated than it seems" (Student 80).

Beyond the knowledge they gained themselves, CFAES students also pointed out the potential for *Clarkson's Farm* to educate others. "The show does serve as a way for people uninvolved in agriculture to learn about the ins and outs of farming," said Student 62. There was an overarching idea of the show having educational value in presenting agricultural experiences and processes to individuals outside the industry: "[*Clarkson's Farm*] teaches its viewers practically everything one needs to know in order to begin farming from scratch" (Student 82).

With their overall lack of farming experience, non-CFAES students represented a less agriculture-minded audience approaching the show. These students appreciated how the show started at the beginning, allowing them to learn alongside Clarkson: "Being new at something it doesn't matter how well off you are, you need to start at ground zero just like everyone else" (Student 39).

Though non-CFAES students came in with little agricultural knowledge, they were not devoid of perceptions of agriculture. "I always thought of farming as being an easy job that anyone can do," said Student 25. Student 24 wrote, "I was taught from a young age that farming can be taxing on the physical side but doesn't require much strategic planning or thought."-Through their viewing experience, many expressed a change of perspective in the modern realities of farming: "Having been given the opportunity to see the financial planning behind a farming operation ... has completely switched my childhood understanding of the profession" (Student 24).

CFAES students were able to take their learning one step further, making connections between their personal experiences and the experiences represented in the show. Students who were familiar with row crop or livestock operations contextualized their own experiences with Clarkson's. They connected with familiar aspects of the show's agricultural practices, while also acknowledging several new ideas and concepts throughout the episodes. Students analyzed the farm's practices, through the lens of their own experiences with agriculture, by building on the practices presented in these episodes.

Overall, students found the show to be educational and found themselves learning more about different aspects of the agricultural industry: “Since this is very much a learning experience for Jeremy Clarkson himself, you get to learn a lot about the farming process as he struggles through it” (Student 69).

Surprise

CFAES and non-CFAES students alike were surprised at many aspects of the show, including finances, government regulations, and infrastructure. Many students had never experienced agriculture in the U.K. and were surprised about several practices presented throughout the show. Students were shocked by the financial aspect of farming operations and the sheer amount of money that was being spent throughout the show: “You need thousands of dollars’ worth of expensive equipment to even have a chance about being profitable,” Student 46 wrote, while Student 64 said, “The biggest thing that stuck out to me was the cost required for farming.” Students realized after watching these episodes that farming often “takes a lot of money for just a little return” (Student 84).

For non-CFAES students, the cost of time was another revelation, as many did not realize cultivating and planting would take Clarkson as long as it did, and that the potential for profit loss due to time delays was significant. They were also cognizant of circumstances beyond Clarkson’s control – weather, pests, equipment malfunction, injury, regulations – which caused additional financial stress, logistical burden, and insecurity: “No matter how advanced, farming in the end is still dependent on the weather” (Student 20).

Both CFAES and non- CFAES students were attuned to the rules and regulations Clarkson was required to follow. Students identified how “government regulations concerning sprays...can really hurt the farmers in [the U.K.]” (Student 66). Overall, students believed the “U.K. has a lot more regulations than the United States” (Student 67). Many were surprised at the level to which the government exerted its control over farms: “I didn’t think it would be to the point in which they tell you where you can and cannot store things” (Student 22).

Realism

Accurate and Authentic Portrayal

In general, CFAES students found *Clarkson’s Farm* to be a relatively realistic depiction of the agricultural industry. One student mentioned enjoying “the realism of the show and the way that its agriculture was portrayed” (Student 61). Others identified the portrayal of the cost associated with farming, stating the show “highlights both the cost and efforts of starting a farm” (Student 69).

Non-CFAES students overwhelmingly appreciated the inclusion of expert perspectives to counter Clarkson’s inexperience with agricultural practices. Experts provided Clarkson, and, by extension, viewers, with additional insight into practical skills and best practices. They offered the institutional knowledge Clarkson lacked and offered the reasoning behind certain decisions. Students valued the realistic portrayal of the struggles associated with owning and operating a farm: “[*Clarkson’s Farm*] shows you the full process of how hard farming is and a lot of the

problems that come with farming” (Student 77). The show “brings out how hard it can be for farmers and presents a real message” (Student 53).

Mistakes

Among both CFAES and non-CFAES respondents, many students reported negative feelings towards Clarkson based on his actions and attitude throughout the show: “I did not like how sporadic Jeremy is with his decision making” (Student 68). Students expressed their concern with Clarkson’s lack of preparedness, feeling he should have engaged in more research before pursuing his various ventures.

Non-CFAES students noted that Clarkson often blatantly disregarded the advice provided by his experts: “I wished that Clarkson would merely follow what he is exactly told” (Student 30). Students expressed frustration with Clarkson in these instances, feeling he incurred unnecessary time and monetary burdens due to his actions. A CFAES student agreed, stating “Jeremy doesn’t think through his action” when he is making new decisions on his farm (Student 54).

Though students expressed their frustration at Clarkson’s inability to follow expert advice, non-CFAES students especially appreciated the inclusion of his mistakes in the show: “While he had people helping him and there were people for him to reach out to, you still watched him make mistakes, even several times. It made the show entertaining, but more importantly, authentic” (Student 7).

Missing Pieces

CFAES students pointed out some of the shortcomings of *Clarkson’s Farm’s* accuracy. Many pointed out the lack of depth in information provided through the show and struggled with some areas that seemed to be missing important context. Some students noted their background in animal agriculture and pointed out areas the show may have skimmed over.

Students with experience and knowledge of agriculture wanted more information about specific practices in the show: “I wish the show would go more in depth on what different crops are they planting and why” (Student 65). “[*Clarkson’s Farm*] didn’t go much into the health aspect of the sheep,” wrote Student 74.

To a lesser extent, non-CFAES students also picked up on gaps in presented knowledge. “I wish the short part of the episode about the one field planted by the previous farmer that got completely destroyed by a species of beetle was expanded,” Student 32 wrote. “It would be a simple search to find a pound to dollar conversion, but when watching I did not have a solid reference point as to what the equipment cost,” commented Student 19.

Unrealistic situations

Though non-CFAES students appreciated Clarkson’s journey as a beginning farmer, they consistently called out the unrealistic nature of his situation regarding his financial capacity: “Jeremy Clarkson is most likely a very wealthy man, therefore, he has much more money to be able to start his farming operation and to be able subsidize his farming errors” (Student 26). They perceived Clarkson’s wealth provided him with additional flexibility with his decisions, in that he could go over-budget when purchasing equipment or pursue what turned out to be an

unprofitable sheep enterprise. This was the most noted element of unrealism in the show for non-CFAES students:

...[It] seems as if Clarkson has unlimited money, and it doesn't really affect his wellbeing when unexpected problems come up and he has to pay for them. [This made] it feel unrealistic because the majority of farmers aren't capable of doing those things. (Student 40).

Students also wondered if Clarkson had uninhibited access to local experts simply by virtue of producing a television show, and if farmers in a similar situation would have the same access to experts as did Clarkson.

Emotion

Overall, CFAES students acknowledged some sort of emotional response to *Clarkson's Farm*. Students identified moments in the show where they felt a connection to the content. Students mention having emotional reactions to the show when presented with situations they had personally experienced. A few students, who have raised livestock, revealed an emotional connection to Clarkson's struggles. They specifically mentioned the financial burden of the livestock industry and the emotional toll of culling animals.

[Clarkson] ... also was able to experience the feeling of having to cull the three ewes.

That's one of the hardest parts of being in the livestock industry because keeping them is just a waste of money, but we often have a moral battle of wanting to keep them alive. (Student 66)

Though most non-CFAES students did not have much livestock experience, they were drawn to Clarkson's developing emotional attachment to his sheep. Many empathized with Clarkson when he was required to cull three of his flock due to their inability to breed. Only a few students were upset by the inclusion of this portion of the episode. Overall, students understood the reasoning behind the decision to cull the sheep, but they were "sad when Clarkson went to say goodbye to his sheep that were to be killed, and when he got there was too late" (Student 45).

Comparing U.S. to U.K.

CFAES students made many comparisons between agriculture in the United States and the United Kingdom. Students identified differences in infrastructure, crop and animal management, weather, and topography. Many stated "that rural England is a very hilly area" compared to areas in the U.S. that they have experienced (Student 58).

Non-CFAES students generally made fewer comparisons between the U.S. and the U.K.: "I did not even think about England having a lot of rural areas, or at least as much as the United States" (Student 41). Non-CFAES students tended to focus on more physical characteristics of the setting: "Rural England is extremely beautiful, and this show has really showcased its beauty" (Student 42). Both CFAES and non-CFAES students fixated heavily on the amount of rainfall depicted in these episodes. Some students noted how the "weather is rather unpredictable" in the U.K. (Student 61).

The differences in infrastructure between the U.S. and U.K. were conspicuous to CFAES students. Students pointed out the size and quality of farm equipment in the U.K., stating that the U.K. does not "have fancy and brand-new equipment like here in the states" (Student 61).

“Jeremy’s tractor that is huge there would just be some regular piece of equipment in the U.S.,” noted Student 69.

For the few non-CFAES students who discussed infrastructure, their perceptions were mixed. Discussing the permanent piping system and stone fences, one student called England “old and technologically behind” and wrote that their technology “no longer works for modern-day farming” (Student 18). However, another student said, “from high tech machinery to massive tractors everything that farmers are doing has been upgraded or changed as technology has progressed over time” (Student 10).

While most students stressed the difference between the U.S. and the U.K., some students identified similarities between the two. One student believes “rural England is very similar to the rural places in the United States” (Student 68).

The community aspect of rural areas resonated with both CFAES and non-CFAES students. Students found that the “demographics are also very similar to (the U.S.) with older men being the owners/operators of the farms” (Student 54). They noted “rural England is a small, tight-knit community,” (Student 12), but were also quick to mention the competitive natures of the industry as “people would judge [Clarkson] on his non-perfect lines” (Student 3). Overall, students found that the U.K. industry is “relatively similar to agriculture in the United States” (Student 62).

Discussion

Students in this study came into the *Clarkson’s Farm* activity with a wide variety of individual experiences and preconceptions. Our initial goal was to explore the differences between CFAES and non-CFAES students, but other dispositional and social susceptibility variables emerged in our analysis.

Dispositional Susceptibility

Students identified their connection to the agriculture industry, citing everything from little to no agricultural knowledge to hands-on agricultural experience. With these dispositional variables, students connected with Clarkson through his own learning process. This connection was especially noted during instances where Clarkson was allowed to fail, even against expert advice. Though students expressed their frustration at Clarkson’s stubborn determination to try things his own way, these mistakes helped the non-CFAES audience especially gain appreciation for the challenging nature of farm work. CFAES students related to the realistic depiction of the struggles involved in agriculture, making connections to personal difficulties they experienced in the industry.

Agricultural Literacy and Preconceived Notions

With higher levels of agricultural literacy, CFAES students often highlighted the surface-level nature of the information being presented. They extrapolated on presented topics in their reflections, further describing the practices within the context of their own knowledge. Non-CFAES students did not have the same levels of agricultural literacy to fall back on. However, they were still curious to know more beyond what the show presented, seeking information that

was not covered in these two episodes. Students' curiosity showcases the educational elements of the show.

Jeremy Clarkson himself assisted students in the learning process by presenting a level of agricultural literacy that connected in some way with all students. To the non-CFAES audience especially, Clarkson mirrored their own preconceptions and prior experiences, and thus served as a proxy to their own learning. For the CFAES audience, Clarkson's journey resonated with them and their own time learning similar agricultural practices.

Social Susceptibility

Preconceptions from Family, Peers, and Industry

Students also identified social susceptibility variables that influenced their consumption of the show. Students with little prior agricultural experience were quick to note their lack of familiarity with the industry. However, these students also discussed perceptions they had received from others, such as farming being an easy job: "I was taught from a young age that farming can be taxing on the physical side but doesn't require much strategic planning or thought" (Student 24). Others discussed brief encounters with farming through family or peer engagement in the industry, namely visiting a relative's farm.

CFAES students were most socially influenced by family and industry beliefs within their own agricultural experiences. Students discussed growing up on a farm, showing animals at livestock shows, and holding agricultural internships. These social variables influenced CFAES students' perceptions of the industry as a whole, as well as their interpretations of *Clarkson's Farm*.

Major of Study – What and How They Learn

Due to the structure of the course, a variety of major programs and interest areas were represented in this group. While we did not link students with their programs of study, many students self-identified their majors in their reflections. The majors prominently mentioned were business, environment and natural resources, animal science, and crop science. Many students utilized their major as an avenue to process the show's content.

Due to the nature of their majors and their associated teaching principles, CFAES students were almost automatically interested in the show's content. Non-CFAES students initially approached the show with disinterest but quickly connected to the show's content and humor and engaged with the episodes throughout viewing. Likely through the foundational teachings of their majors, non-CFAES students utilized logic when analyzing the show's content. Self-identified business majors were especially invested in the problem-solving nature of the show, as they were guided through the puzzle of starting a farm from the ground up.

Clarkson's Farm had educational value for all students in this study. No matter past experiences or education, students came out of this experience with a better understanding of the agricultural practices presented throughout the episodes. CFAES students went a step further with the educational possibilities of the show. They found *Clarkson's Farm* to be a positive representation of the agricultural industry and felt that the show could be used for the education

of individuals with less social connection to the industry. Non-CFAES students, representative of a non-agricultural audience, positively received the content and came away with changed perspectives and appreciation for the agricultural industry.

Implications & Recommendations

This study demonstrates the power of *Clarkson's Farm* to introduce a non-agricultural audience to agricultural practices in an approachable and manageable way. As evidenced by student reactions, this popular media is a valuable tool for agricultural educators who work with non-agricultural audiences. The show can also serve as a guide for agricultural communicators who are seeking effective ways to present agriculture content to non-agricultural audiences. The show exposes agricultural audiences to new or unfamiliar methods, providing opportunities to reflect on their own practices.

Though students came into the experience with different backgrounds and agricultural knowledge, their reflections depicted a similar understanding of the presented topics. This indicates the value of *Clarkson's Farm*, and similar popular media, to encourage discussions between agricultural and non-agricultural audiences.

For educators seeking to implement *Clarkson's Farm* into their own curriculum, we recommend a few practical adaptations to assist in grounding the experience within the context of U.S. agriculture. Throughout their reflections, students would often relate the concepts depicted in the show to similar or different U.S. practices. To assist in grounding the experience, we recommend leading discussion post-viewing to explore regulations, types of crops and livestock raised, growing cycles and practices, and conservation programs. For an agricultural audience, this discussion will help to relate the show to their own knowledge. For non-agricultural audiences, discussion will help them understand how these practices translate to the realities of agriculture in the United States.

Due to the structure of the course and the time limits associated with a general-education course, this activity was limited to two course days. With the show's structure, only the beginning of processes, such as planting and sheep breeding, were discussed. To solidify student learning, it would be beneficial to show additional episodes where the culmination of these processes, such as harvesting and lambing, are depicted. If additional full episodes are not possible due to time constraints, clips from these episodes would also be sufficient in filling some of the knowledge gaps identified by the students of this study.

In this study, reflections were completed individually following each of the two episodes. In future studies it would be beneficial to analyze focus group discussions following the episodes to gather a combined perspective of the show. While differences between CFAES and non-CFAES students were identified, there is also the potential to look deeper into individual major differences and the influence this may have on students' social susceptibility.

Beyond classroom study, future research could explore the impact of *Clarkson's Farm* on a non-collegiate audience, such as upper-level high school students or older adult learners of agriculture and non-agriculture backgrounds. With the approachability of the content and its international impact, it is well-suited to exploration of a broader audience.

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An Investigation of Oregon and Texas Residents' Information Seeking and Processing Behaviors During Extreme Weather Events

Extreme weather events plague the United States with increasing frequency and intensity. In 2020, Oregon was met with historic megafires and Texas experienced the significant impacts of Winter Storm Uri. As these types of events increase and unfold, it is crucial for those impacted to have the information needed to navigate the risks and potential effects. This study sought explore how individuals seek and process information to make decisions about extreme weather events. Comparing data from both Oregon and Texas weather disasters, our analysis yielded helpful insights to better understand information seeking and processing. Despite different events, we found no differences in information gathering capacity and information sufficiency threshold between disasters. We also found information gathering capacity to decrease as information sufficiency increased. Regarding the types of information sought, participants from both states indicated a major need for information about the risks and impacts of the extreme weather event and its severity. Finally, we found participants largely relied upon systematic processing routes to assess information about the extreme weather events in their states. Implications and recommendations for future research are discussed.

Introduction

Throughout the United States and world, extreme weather events are increasing in frequency and intensity (Ebi et al., 2021). These extreme weather events vary from drought to flood, and blizzard to wildfire. One record-breaking extreme weather event occurred in September of 2020 when multiple fires began burning in Oregon. The intense nature of these fires was due to multiple days with high winds, hot temperatures, and prolonged dry conditions (Oregon Office of Emergency Management, 2022). As a result, five megafires (fires greater than 100,000 acres) engulfed parts of Oregon (Rasmussen et al., 2021). Consequently, over one million acres burned, more than 40,000 residents evacuated from their homes, more than 6,000 homes and structures were destroyed, greater than half a million people were given evacuation warnings, and at least nine people died due to the fires (Oregon Office of Emergency Management, 2022; Rasmussen et al., 2021; Rosbach, 2022). In addition, much of the state's population was at risk for health issues from toxic wildfire smoke exposure (Navarro & Vaidyanathan, 2020). The agriculture industry was also impacted. Livestock producers in [Region] reported direct impact to their farms and ranches in terms of crop and pasture loss, and declines in animal health (O'Hara et al., 2021). With many of Oregon's communities intermingled in forestland and wilderness areas, the threat of future wildfires will remain a significant risk (Profita, 2022).

At the other edge of the extreme weather spectrum, millions were left without power in February 2021 when Texas's electrical grid lost power supply due to Winter Storm Uri (Randall, 2022). The Texas's electrical grid could withstand the more common hot summers but were not equipped to respond to freezing weather (Norton, 2021). Sixty-nine percent of Texas residents lost power during the storm and nearly half lost water service (Donald, 2021). Many Texas residents were not prepared for the uncharacteristically cold weather and storm (Ahmed, 2021; Li et al., 2022). Although meteorologists shared warnings about the severe nature of Winter Storm Uri, it is unclear if residents acted on the warnings or had the financial resources to

prepare for the storm's impacts (Ahmed 2021; Li et al., 2022). Winter Storm Uri resulted in 246 deaths throughout Texas, with most attributed to hypothermia (Svitek, 2022). Losses in agriculture totaled more than \$600 million (Schattenberg, 2021). After the storm, the Texas Legislature ordered electricity regulators to winterize their plants following federal guidance to mitigate future crises (Cai et al., 2022). However, lawmakers did not require the Texas Railroad Commission, which regulates natural gas, to adhere to any weatherization standards (Cai et al., 2022), leaving Texas residents vulnerable to a similar disaster in the future (Douglas, 2022).

While the details associated with the extreme weather events shared above are unique to the states and state residents who experienced them, remaining areas of the United States and world are not immune to the risks from or effects of extreme weather events and other effects of climate change (Haines & Patz, 2004). In fact, scientists estimate more record-breaking extreme weather events will continue (Urness, 2020). Climate change and its associated extreme weather events will impact the health, environment, and economy of people worldwide (Crimmins et al., 2016; United States Environmental Protection Agency [EPA], 2022; World Health Organization, 2021). With the increase in droughts, wildfires, and extreme rainfall occurring faster than scientists previously assessed (NASA, 2023), the Intergovernmental Panel on Climate Change (2022) predicts multiple climate disasters will occur simultaneously merging both non-climate and climatic risks such as increased food prices, reduction of household incomes, and increases in malnutrition. The infrastructure in the United States, including agriculture, transportation, communication, power, and water systems, is also vulnerable to disruptions due to extreme weather-related events caused by climate change (Bell et al., 2016). Beyond the risks and negative outcomes posed to the world and society as a whole, agriculture, too, has been and stands to be further impacted by extreme weather. Climate events including drought, floods, storms, and wildfires have all been marked as factors in decreased agricultural production (United Nations Framework Convention on Climate Change, 2021). Climate change will stress the worldwide food system by increasing the demand for food supplies, altering ecosystems and the availability of species, and adding pressure to agricultural livelihoods (Barange & Perry, 2009).

As extreme weather events increase, putting communities, people, agriculture, and systems at risk, it is crucial for those impacted to have the information needed to navigate the risks and potential effects. From a perspective of message content, Mileti and Sorensen (1990) suggested five content types that should be included in effective warning messages including, 1) general information about the hazard itself such as impact, severity, and consequences, 2) guidance for protective action from the threat, 3) threat location and who could be impacted, 4) time available to take action in response to the threat, and 5) the source or organization of the message. These messages must be clear in communicating what to do and how to do it to ensure the greatest chance of maximizing health and safety (Sutton et al., 2021). It is also important to note the role of the information source in effectively communicating a message. When situations are accompanied with risk and uncertainty, understanding the sources relied upon must be paid attention. Past studies have found individuals to rely largely upon mass media sources (Austin et al., 2012; Taylor et al., 2009) and interpersonal networks (Spence et al., 2007) during extreme weather events.

Effective risk communication during extreme weather events remains challenging (Bostrum et al., 2018). Studies are needed to understand how individuals seek and process information to make decisions amidst a disaster (Coughan et al., 2022). This study seeks to address these needs as the purpose is to explore and compare risk information seeking and processing during two different extreme weather events.

Conceptual Framework

Risk Information Seeking and Processing

In an effort to better understand individual characteristics that may influence and predispose persons to seek and process information about risk, Griffin et al. (1999) proposed the Risk Information Seeking and Processing (RISP) model. Rooted in the Theory of Planned Behavior (Ajzen, 1988) and the Heuristic Systematic model (Eagly & Chaiken, 1993), the RISP model assumes the complex nature of risk and potential for serious consequences require the conditions that influence how information is processed to be understood (Griffin et al., 2013). The RISP model seeks to capture the relationship between information processing goals and beliefs and attempts to measure the impacts of risk information seeking and processing capacities (Griffin et al., 2013).

Seven factors are suggested as predictive influences on individuals' information seeking and processing behaviors including individual characteristics, perceived hazard characteristics, affective risk response, felt social pressures to gain pertinent information, information sufficiency, the individual's capacity to learn, and beliefs about information usefulness (Griffin et al., 1999). The variety of factors offer ample opportunity to explore risk information seeking and processing in a variety of contexts. Previous studies have applied the RISP model to explore information sources used during extreme weather (Armstrong & Usery, 2022) and to determine predictors of risk perception (Yang & Zuhang, 2020). No studies have used the RISP model to specifically explore the relationships between information gathering capacity, types of information, information sufficiency thresholds, and information processing, which are key variables of inquiry in this study.

When presented with a perceived need to gather information related to risk and ambiguity, an individual may need to dedicate more cognitive effort and seek nonroutine channels of information (Griffin et al., 1999). Previous studies have shown individuals navigating different weather-related events sought to gather similar, yet varying types of information. For instance, before Superstorm Sandy, at-risk individuals sought information about safety, health risks, and evacuation routes (Burger et al., 2013; Demuth et al., 2018). During a tornado event, residents sought information on how to safely shelter from the storm (Silvert & Andrey, 2019). In Florida, those at-risk of hurricane impacts sought to gather information about the storm's intensity and other impacts (Bostrum et al., 2018).

A function of information gathering, the information sufficiency threshold refers to one's perception of being in command of enough information to reach a desired conclusion or outcome (Griffin et al., 1999). Reaching an information sufficiency threshold is impacted by the individual's capacity to gather the information needed, along with one's self-efficacy of

perceived behavioral control to find and process needed information (Griffin et al., 1999). Information gathering capacity has been shown to predict motivation to seek information during some extreme weather events (Yang & Zhuang, 2020).

As sufficient information is gathered, information processing unfolds and occurs through a systematic or heuristic route. When individuals process information systematically, careful and analytical thinking are applied (Yang et al., 2014a). On the other hand, heuristic processing involves less mental effort overall and more reliance on mental cues or cognitive shortcuts (Yang et al., 2014b). Heuristic processing can present some benefit as it holds the advantage of speed (Gigerenzer & Goldstein, 1996; Gigerenzer, 2000), but systematic processing tends to result in better decision making (Griffin et al., 2013). In-depth systematic information processing typically yields longer-lasting attitudes (Eagly & Chaiken, 1993), which are helpful for encouraging individuals to engage in and adopt behaviors and beliefs related to health, safety, and the environment (Ajzen & Manstead, 2007). In a study that investigated influences on support for climate change mitigation policy, Yang et al. (2014b) found systematic processing was positively related to support for policy, while heuristic processing was not a significant predictor.

Purpose and Research Questions

As communities throughout the United States continue to experience increased and recent severe weather-related events and disasters, understanding the factors involved with risk information seeking and processing is paramount to lessening negative impacts. This study was guided by the following research questions:

1. Did information gathering capacity and information sufficiency thresholds differ by the type of extreme weather event?
2. Did participants' perceived information gathering capacity and information sufficiency thresholds vary together?
3. What were the most common types of information Oregon and Texas residents sought during the 2020 wildfire season and Winter Storm Uri?
4. Did the type of the information sought during extreme weather relate to systematic or heuristic information processing routes?

Methods

Data for this study were collected using researcher-developed quantitative instruments to determine perceptions and experiences of Oregon residents during the 2020 Oregon wildfire season and Texas residents during Winter Storm Uri. The Institutional Review Boards at both universities granted approval to conduct the studies. Data were collected independently from Oregon and Texas residents in November and December of 2021.

In order to compare information seeking and processing behaviors between different states and different extreme weather events, two populations were the focus of this study. The first population was Oregon residents who lived in Oregon during the 2020 wildfire season. The second population was Texas residents who lived in Texas during Winter Storm Uri. Samples representing both state populations were recruited through Qualtrics, a third-party company, who

administered each survey instrument. To ensure representation most similar to the population of Oregon, researchers set a quota to collect responses from 65% suburban/urban residents ([State A Office of Rural Health, 2021), and approximately 50% females and 50% males. Partial responses were not recorded, yielding a final sample of 384. Participants from Texas were also matched to census demographic data (United States Census Bureau, n.d.) for gender (approximately 50% male, 50% female), but community type was slightly adjusted for additional variance (33% rural, 66% urban/suburban). A final sample of 436 complete responses were collected from [State] residents.

The items presented to participants in both survey instruments were the same with the exception of extreme weather context. When weather event specificity was required, the items in some measures were customized to indicate the weather event under investigation. For Oregon residents, the contextual setting was for the 2020 wildfires, and for Texas residents, the context was for Winter Storm Uri. Example statements to illustrate the item differences are included below. Reliability for each measure was achieved *a priori* in separate pilot tests conducted in both Oregon and Texas populations. Each pilot test sample had 50 responses.

Measures

Information Gathering Capacity

To measure information gathering capacity, participants in Oregon selected their levels of agreement with four items adapted from Yang et al. (2014b). Each statement was measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability for this measure achieved in the Oregon pilot test ($\alpha = .88$). This measure was attained slightly differently in the Texas sample. Here, participants were prompted to select one of the four statements with which they most agreed. Example statements included, “I can’t make sense of information about [weather event],” and “Most information about [weather event] is too technical for me to understand.”

Information Sufficiency Threshold

Information sufficiency threshold was reported using a one-item, sliding scale with scale points ranging from 0 (*I need to know nothing*) to 100 (*I need to know everything possible*), per Yang et al. (2014b). The prompt requested participants used the scale described above to respond to the following statement, “Please estimate how much you think you need to know about the risks of [weather event].”

Heuristic Processing

Participant application of heuristic processing routes during the extreme weather events was measured through participant ratings of three items. The items in this scale were adapted from Yang et al. (2014b). Each of the statements were measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability for this measure was confirmed *a priori* in pilot tests for Oregon sample ($\alpha = .86$) and Texas sample ($\alpha = .86$). Example items in this measure included, “When I see information about [weather event] risks, I rarely spend much

time thinking about it,” and “There is far more information on [weather event] risks than I personally need.”

Systematic Processing

Participants rated four items to indicate their levels of systematic processing during the respective extreme weather events. Items used in this measure were also adapted from Yang et al. (2014b). Each of the statements were measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability was achieved *a priori* in both Oregon and Texas pilot tests, respectively ($\alpha = .84$, $\alpha = .80$). Example statements from this measure included, “After I encounter information about [weather event] risks, I am likely to stop and think about it,” and “When I encounter information about [weather events], I read or listen to most of it, even though I may not agree with the perspective.”

Information Type

Eleven items were used to determine the types of information participants sought during each extreme weather event. Participants were asked to rate each item using a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Items were created based upon a review of risk information seeking literature (Lachlan et al., 2014; Ryan, 2013). Acceptable levels of reliability were confirmed *a priori* in pilot tests for both a Oregon ($\alpha = .86$) and Texas ($\alpha = .85$) samples. Participants were prompted to rate their levels of agreement regarding the types of information sought during the extreme weather events. Example information types included extreme weather location, how to keep pets and livestock safe, safety of individuals, friends, family, and policy and emergency orders.

Procedure

Participants received information about the respective extreme weather study and granted consent to participate before starting the survey. Next, participants were prompted to provide their gender and community type to ensure the established quotas were met. In each sample, participants were prompted to read a short description of the effects of the extreme weather event (wildfire or winter storm) in their state and asked to rate items regarding their experience during their state’s extreme weather event.

Data Analysis

Data from both instruments were imported from Qualtrics to SPSS Version 28 for analysis. Descriptive and inferential statistics were employed to address the research questions. Each measure was tested and found to be reliable via Cronbach’s alpha (Ary et al., 2018) and assumptions for each of the statistical tests were verified. Normality was assessed using a Shapiro-Wilk test and through a visual inspection of the Q-Q plot. Research questions one and two were assessed through pair-samples t-tests (Field, 2018). Research questions three and five were assessed by Pearson correlations (Field, 2018). Descriptive statistics were applied to address research question four.

Findings

RQ1: Did information gathering capacity and information sufficiency thresholds differ by the type of extreme weather event?

Research question one sought to determine if information gathering capacity and information sufficiency thresholds differed by weather event. A paired samples t-test revealed no significant differences in information gathering capacity between state weather events $t(383) = 6.14, p = .22$. An additional paired samples t-test revealed no significant differences in information sufficiency thresholds between state weather events $t(380) = .72, p = .60$.

RQ2: Did participants' perceived information gathering capacity and information sufficiency thresholds vary together?

The aim of research question two was to determine if participants' perceived information gathering capacities and information sufficiency thresholds varied together. Significant negative correlations were found in the cases of both extreme weather events. For the Oregon participants who experienced the 2020 wildfire season, a Pearson correlation revealed a significant negative correlation with a small effect (Cohen, 1988) between information gathering capacity and information sufficiency threshold ($r = .10, p < .05$). Similarly, an additional Pearson correlation revealed a significant negative correlation with a small effect (Cohen, 1988) between information gathering capacity and information sufficiency threshold ($r = .12, p < .05$) for participants who experienced Winter Storm Uri in Texas. These results indicate as the information sufficiency threshold increased, information gathering capacity decreased.

RQ3: What were the most common types of information Oregon and Texas residents sought during the 2020 wildfire season and Winter Storm Uri?

In research question three, our objective was to determine the most sought information types during the 2020 Oregon wildfire season and 2021 winter storm Uri in Texas. As outlined in Table 1, residents living in Oregon during the 2020 wildfire season most sought information about location of the fires ($M = 4.46, SD = .87$), followed by severity of fire ($M = 4.42, SD = .86$), and fire impact and risk ($M = 4.2, SD = .97$). Residents living in Texas during Winter Storm Uri also sought information about storm severity most frequently ($M = 4.40, SD = .87$), as well as storm impact and risk ($M = 4.28, SD = .90$), but unlike Oregon residents, sought the time of storm impact ($M = 4.28, SD = .95$).

Table 1

Most Sought Information During Oregon Wildfire Season (N = 384) and Winter Storm Uri in Texas (N = 436)

Information Type	Wildfire Season		Winter Storm Uri	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Location of fires	4.46	0.87	-	-
Severity of weather event	4.42	0.86	4.40	0.87
Weather event risk and impacts	4.20	0.97	4.28	0.90
Time of winter storm impact	-	-	4.28	0.95

RQ4: Did the type of the information sought during extreme weather relate to systematic or heuristic information processing routes?

Finally, research question four was to determine if the type of the information sought out during the extreme weather events related to systematic or heuristic information processing routes. Pearson correlations indicated moderate significant positive relationships (Cohen, 1988) between the three the most sought out information types and systematic processing in both the Oregon and Texas samples (Table 2). This finding suggests as the need for key wildfire and winter storm information increased, so did the employment of systematic information processing. For Oregon and Texas residents who experienced wildfire risk and winter storm risks, the strongest correlation associated with systematic processing was observed with information about wildfire risk and impacts ($r = .46, p < .05$), and winter storm risks and impacts ($r = .47, p = <.05$).

On the other hand, Pearson correlations revealed small and moderate significant negative relationships (Cohen, 1988) between all of the information types most-frequently sought during both the 2020 wildfire season and 2021 winter storm and heuristic information processing (Table 2). This finding, opposite of the correlations between systematic information processing and information type seeking, suggests as the need for key information about extreme weather events increased, the use of heuristic processing routes decreased. The strongest relationship between heuristic processing and information type was observed with impacts and risks for both those seeking information about the wildfires ($r = -.31, p <.05$), and those who sought information about the winter storm ($r = -.24, p < .05$).

Table 2

Pearson Correlation Coefficients between Frequently Sought Information Types and Systematic and Heuristic Processing for Oregon (N = 384) and Texas (N = 436)

Information Type by State	<i>Systematic Processing</i>		<i>Heuristic Processing</i>	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Oregon				
Risk and impacts of fires	.46	<.05	-.31	<.05
Location of wildfires	.46	<.05	-.21	<.05
Severity of wildfires	.45	<.05	-.23	<.05
Texas				
Risk and impacts of storm	.47	<.05	-.24	<.05
Severity of storm	.45	<.05	-.21	<.05
Impact time of storm	.43	<.05	-.18	<.05

Discussion and Recommendations

The findings in this study provide insight to information seeking and processing behaviors during two opposite extreme weather events – historic wildfires and an abnormal winter storm. As extreme weather risks continue to threaten communities and systems, including agriculture, in the United States and world (Crimmins et al., 2022; Haines & Patz, 2004; Urness, 2020), we in agricultural communication must work to understand information seeking and processing to create messages that will aid and educate the public as they prepare for weather disasters and provide crucial, sufficient information as disasters unfold (Coughan et al., 2022). The weather events that served as the context of this study took place in different states and seasons and left those affected to deal with different impacts. However, as many of our findings suggested, despite the differences between the extreme weather events investigated, many of the information seeking and processing behaviors explored were consistent between those who experienced Winter Storm Uri in Texas and those who experienced the 2020 Oregon wildfires.

Our first finding revealed no significant differences between groups in regard to information gathering capacity and information sufficiency thresholds during the extreme weather events unique to each state. This finding suggests while extreme weather events always have some element of distinction, individuals who experience extreme weather risk in general appear to dedicate similar cognitive resources to finding information they need to make decisions and navigate the risk at hand. Prior work indicates situations associated with risk and ambiguity

may call for increased cognitive effort and the need to access nonroutine information channels (Griffin et al., 1999). While this study is limited in the fact that we cannot know the extent of cognitive effort applied to information gathering and the details associated with the perceived information sufficiency thresholds, we can conclude the participants in this study were able to find information sufficient to reach a desired outcome in regard to the extreme weather event they needed to navigate (Griffin et al., 1999).

In a similar vein, statistical analysis revealed as participant levels of information sufficiency increased, their information gathering capacities decreased. While this finding is unsurprising given the role information gathering contributes to information sufficiency (Griffin et al., 1999), it is interesting to consider future studies that can explore the nuance of information gathering processes, and how individuals reach and define acceptable levels of information sufficiency. As information gathering capacity has been shown to be a significant predictor of information seeking behavior (Yang & Zhuang, 2019), future studies should also explore factors that contribute to self-efficacy of perceived control to find needed information (Griffin et al., 1999). Previous studies highlight the role of experience in making decisions about weather-related risk (Bostrum et al., 2018; Burger et al., 2013; Demuth et al., 2018; [Anonymous, 2023]). It is possible the role of experience influenced information gathering and information sufficiency in this study due to the unique and largely unfamiliar nature of both the 2020 Oregon wildfires and Winter Storm Uri in Texas. While it is plausible that participants have likely experienced some form of weather related to the extreme weather events explored in this study, it is also reasonable to assume that given the extreme and unusual nature of both events participants had little to no experience that compared to the magnitude of the 2020 Oregon wildfires and Winter Storm Uri in Texas. Did the level of experience with similar weather events influence information seeking? Future studies should investigate this potential phenomenon. This assumption should also be tested in future studies as future extreme weather events take place.

Given the extreme weather contexts between groups assessed in this study and the variety of studies that explored information sought during other extreme weather events (Burger et al., 2013; Demuth et al., 2018; Silvert & Andrey, 2019), we sought to explore any potential distinction in the types of information sought during both the 2020 Oregon wildfires and Winter Storm Uri in Texas. Comparing this finding to other extreme weather events that have been explored in terms of information gathering and seeking in the past (Burger et al., 2013; Demuth et al., 2018; Silvert & Andrey, 2019), connections can be drawn to themes involving safety and extreme weather impacts. It is interesting that despite the differences in extreme weather events explored in this study, two of the three leading types of information sought were the same for both Oregon and Texas: risk and impacts, the severity of the weather event, both aligned with what Miletti and Sorensen (1990) suggested as effective warning message content. As communicators, this is a critical finding. Despite the differences, we can work to craft messages that address similar needs and concerns, while remaining mindful of other contextual factors associated with a specific extreme weather event. However, there is also nuance in the type of information sought between the wildfire and Winter Storm Uri as indicated with some difference in the top types of information sought between groups. This specificity suggests the participants sought a variety of information, and it is likely certain audiences sought certain types of information key to individuals' unique situations as related to the extreme weather event. Future

studies should explore audience segmentation of groups impacted by extreme weather to more precisely describe the types of information different groups seek to find during these events.

Finally, in this study we sought to investigate any potential relationships between types of information sought and information processing routes. Although it has been argued heuristic processing can be helpful when time is limited (Gigerenzer & Goldstein, 1996; Gigerenzer, 2000), many agree systematic information processing leads to more positive impacts overall (Ajzen & Manstead, 2007; Eagly & Chaiken, 1993; Griffin et al., 2013). In this study, we found moderate significant positive relationships between highly-sought types of information and the systematic processing route and significant moderate negative relationships between highly-sought information types and heuristic processing. As communicators, the use of systematic processing routes during these two weather events is promising. However, we must be careful to craft messages that respond to the information needs of those at risk. As extreme weather events unfold in varying timeframes, future studies should more carefully explore the role of time in relation to systematic or heuristic processing routes. Both the wildfires and Winter Storm Uri unfolded less quickly than other extreme events (such as tornadoes and flash floods), which may have also provided enough time for participants to adequately seek information, thereby contributing to the ability for participants to systematically process information.

As we conclude this study, it is important to discuss implications for teaching agricultural and natural resources communication. The country and world will continue to experience the effects of climate change and extreme weather (Ebi et al., 2021), so it is therefore important that we prepare future communicators to create effective messages to help individuals to be educated and informed in order to navigate risk and crisis. Agricultural communication practitioners are encouraged to share resources and templates used to communicate about extreme weather events given the similarities of information needed across events, but to also discuss nuance.

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A Historical Review of Course Requirements in Agricultural Mechanics for Agricultural Education, Teacher Education Undergraduates at Nine 1862 Land-Grant Universities

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Abstract

“Preparing teachers to teach agricultural mechanics is a difficult task since many topic areas are included in the curriculum” (Byrd et al., 2015, p. 20). This study examined the trend in university requirements for number of courses, course credit hours, and course topics related to agricultural mechanics, as well as the total credit hour requirement for teacher education degree completion in agricultural education. Overall, the universities examined had lessened the total course credit hours related to agricultural mechanics courses from 8.33 to 11.83 credit hour requirements in 1980, to a range of 6.67 to 8.33 credit hours in 2021. Similarly, the total credit hours required for teacher education degree completion in agricultural education had decreased from an average of 128.4 total credit hours to 125.0 credit hours over the same time period. Course topics found to be the most common from 1980 to 2021 were 1. Intro to Ag Mechanics, 2. Welding, and 3. Construction/Structures. It is recommended that qualitative interviews be conducted with cognizant university faculty to ascertain the importance of the various course topics and analyze how topics were identified as imperative in their respective programs, including whether the views of industry stakeholders were considered.

Introduction

The teaching of vocational agriculture mechanics at the collegiate level can be traced to before the enactment of the Smith-Hughes Act of 1917 at some institutions. Courses have ranged from metal fabrication to electricity to structures to machinery over time (Burriss et al., 2005; Byrd et al., 2015; Hubert, 1996). Burriss et al. (2005) concluded that agricultural mechanics is one of, if not, the highest rated student interest area in school-based agricultural education (SBAE) programs. Harrison et al. (1993), however, found that a decrease in the number of students enrolling in traditional vocational agriculture education at the secondary and post-secondary levels, as well as in career and technical education degree programs, coupled with the reduced funding of programs had led to a decline in course offerings and requirements by some undergraduate programs. Moreover, Hubert and Leising (2000) noted that “student teachers reported high levels of anxiety associated with teaching agricultural mechanics prior to and during their student teaching” (p. 24), which may have been due to less experience with the subject during teacher preparation course-taking.

A decline in teacher preparation requirements for agricultural mechanics led to more of an emphasis on teaching basic content knowledge and less on laboratory management and methods to teach such content, according to Hubert (1996). Moreover, McKim and Saucier (2013) identified a decrease from an average of 17.39 course credit hours of agricultural mechanics instruction taken at the post-secondary level to 11.30 course credit hours of instruction for preservice students over a 41-year period (see Table 1, p. 157). On the other hand, Hubert (1996) found that three-fourths of the 59 university programs identified in their study required only 2.9 course credit hours or less of instruction related to agricultural mechanics for degree completion.

Although nearly 20 years expired between these studies, the difference warrants closer examination.

Ralph Tyler, whom many consider a leader in the modern approach to curriculum development, contended that “[b]y the cumulation of many educational experiences profound changes develop in the learner” (Tyler, 1958, p. 106). This would include teachers’ acquisition of knowledge and skills to teach agricultural education. A review of agricultural mechanics course requirements and course topics to identify trends in content preparation of SBAE instructors over time could inform teacher educators, members of state staffs, school administrators, and other stakeholders about current requirements in agricultural mechanics, and thereby the likely preparedness of beginning instructors to teach agricultural mechanics, including potential deficits and needs for inservice.

Upheavals and Challenges to SBAE Beginning in the 1980s

The Program Specialist for Agriculture, Agribusiness, and Natural Resources in the Bureau of Occupational and Adult Education (OAE) in the United States Department of Education, Dr. Byron F. Rawls, in his 1980 article “Facing a Decade of Change,” identified seven challenges agricultural education would face in the coming decade. At least three of Rawls’ challenges that pertained to the framing of this study included:

1. Changes in the way teachers see their responsibilities and opportunities. Much more information is needed in order to adjust attitudes of the entire profession concerning preparation and retention of teachers who will provide quality instruction at all levels.
2. Accurate matching of required competencies, including personal development, with the duties to be performed will have implications for initial preparation for an occupation and for keeping current in employment through programs designed for this purpose.
3. Technology will continue to change. The base for technological development is much broader than a decade ago. [One] can only guess what the parade of agricultural technology will be, but we must be responsive in our program planning and implementation to keep up and, if possible, stay ahead of developments. (Rawls, 1980, p. 5)

Moreover, in the 1970s and leading into the 1980s, enrollment in post-secondary agricultural education programs increased 102% (Warmbrod, 1980). Enrollment also increased 27% for secondary high school students enrolling in SBAE programs (Warmbrod, 1980). However, a key concern for the future of agricultural education identified by Warmbrod (1980) was the competency of the teachers graduating universities in agricultural education, teacher education. Warmbrod (1980) asked: “Are university graduates certified to teach as highly competent technically and professionally as they should be?” (p. 8). Warmbrod’s admonition included teachers’ abilities to teach agricultural mechanics.

A second factor that supported this study’s framing was the passage and enactment of the 1984 Carl D. Perkins Vocational Education Act. The Carl D. Perkins Vocational Education Act of 1984 (P.L. #98-524) was an act devoted to

[s]trengthen[ing] and expand[ing] the economic base of the nation, develop human resources, reduce structural unemployment, increase productivity, and strengthen the nation's defense capabilities by assisting the States to expand, improve, and update high-quality programs of vocational-technical education, and for other purposes. (para. 1)

The act allocated funds to be used in public education for the teaching of vocational and technical education, including vocational agriculture education (P.L. #98-524). SBAE programs that wanted the funds needed to provide documentation on how such funds would be used to aid in meeting the needs of general occupational skills development of students.

As both of these factors having been identified as major issues facing agricultural education in the past, and a variety of instructional topics taught in university agricultural mechanics courses over time, the number of required instructional hours and content areas continues to be a topic of discussion in the discipline (Byrd et al., 2015; Clark et al., 2021; McKim & Saucier, 2013; Rasty et al., 2017; Saucier et al., 2012). With differences in the findings for the number of course credit hours offered and required at various universities preparing SBAE teachers, the phenomenon warranted a historical review to better understand trends that may presage the future outlook and related teacher preparation needs.

Purpose and Research Question

This historical research study's purpose was to explore the course credit requirements at select 1862 land-grant universities from 1980 to 2021 regarding agricultural mechanics and related courses. The year 1980 was chosen for the beginning of data collection due to the 1980s being a decade of great upheaval and change in vocational education overall, including agricultural education. The 1983 report *A Nation at Risk* (Bell, 1983) as well as enactment of the first Carl D. Perkins Act (Carl D. Perkins Vocational Education Act, 1984), respectively, called for a renewed emphasis on academic course-taking by secondary school students and for what would become known as career and technical education assisting to achieve that aim. Therefore, the research questions that guided this study were 1. What was the trend in course requirements related to agricultural mechanics courses for completion of vocational agriculture education, career and technical education, and agricultural education undergraduate degrees across nine 1862 land-grant universities over time? and 2. What topics were taught in agricultural mechanics courses for degree completion in agricultural education, teacher education at nine 1862 land-grant universities over time? This study aligns with research priority number five of the *American Association for Agricultural Education (AAAE) National Research Agenda: Efficient and Effective Agricultural Education Programs* (Thoron et al., 2016).

Methodology

Historical research methods were used in the study's data collection process (McDowell, 2002) by accessing online databases and search engines, exchanging personal communications, and reviewing institutional library's resources. The sample for this study was identified by using systematic sampling of 1862 land-grant universities. The three AAEE regions were used to frame the sub-groups of the study: 1) North-Central, 2) Southern, and 3) Western. Each sub-group had all 1862 Land-Grant Universities alphabetized; such were numbered based on alphabetical order and a random number generator was used to select three institutions from each

region. The nine institutions identified for this study were North Dakota State University (ND State Univ.), Purdue University, and West Virginia University (WV Univ.) of the North-Central region; University of Arizona (Univ. of AZ), University of Idaho (Univ. of ID), and Washington State University (WA State Univ.) of the Western region; and Louisiana State University (LA State Univ.), Auburn University, and University of Kentucky (Univ. of KY) of the Southern region. The universities were contacted by the lead investigator to provide documents pertaining to the course-taking requirements for their respective undergraduate degrees in agricultural education, teacher education or otherwise named for the years from 1980 to 2021. William Cronon (2009) expressed that historical researchers seek to uncover documents that aid them in their study of answering their research questions. A *document*, as Cronon (2009) explained, “... can be a book or a newspaper, but it can also be almost anything else that contains traces of the past: a photograph, a map, an artifact, a memory, a landscape—almost anything” (para. 11).

Our primary sources included university records of degree completion requirements, or course-taking requirements, as set forth by the respective academic departments and their institutions. Secondary sources were documents that cited primary sources. The key terms and phrases used to aid in finding the study’s sources via online searches were 1) vocational agriculture education degree requirements, 2) career and technical education degree requirements, 3) agricultural education degree requirements, 4) agricultural mechanics course requirements in agricultural education, and 5) historical agricultural mechanics requirements for vocational and career and technical education degrees. Searching for “vocational agriculture,” “agricultural education,” and “career and technical education” reduced the possibility of *presentism* occurring if considering historical versus mere current-day naming conventions (Johnson & Christensen, 2012). The universities’ digital archives were searched to gather data. Electronic mail messages were also sent to faculty identified as teaching in the nine institutions’ agricultural education, teacher education units to further source data. Limitations of this study include non-responses from some of the contacted individuals at institutions, as well as unobtainable or incomplete faculty records in a few cases.

A database collection detailing all documents received, identified, and examined for accuracy and authenticity was created to organize findings to answer the study’s research questions (McDowell, 2002), i.e., internal criticism and external criticism of the findings were conducted (Johnson & Christensen, 2012). The data were organized by date to establish a chronological order. Next, an analysis of the course requirements by university was completed. Data analysis consisted of determining the average number of course credit hours related to agricultural mechanics courses required by the institutions, number of courses required, total course credit hours required for undergraduate degree completion, and course content.

Findings

Research Question 1: What was the trend in course requirements related to agricultural mechanics courses for completion of vocational agriculture education, career and technical education, and agricultural education undergraduate degrees across nine 1862 land-grant universities over time?

Online searches using the nine universities’ internal search engines and their respective websites and personal communications with faculty who taught and supervised three of the institutions’

agricultural education teacher preparation programs (A. Marx, personal communication, November 2, 2021; R. Roberts, personal communication, October 4, 2021; B. Talbert, personal communication, October 4, 2021) yielded archived course catalogs and related information about undergraduate degree completion requirements. The catalogs, for examples see Figure 1 and Figure 2, offered descriptions of course titles, course topics, and requirements for undergraduate degrees in agricultural education, teacher education, including agricultural mechanics.

Figure 1

University Course Catalog Example – Louisiana State University 1987 – 1988

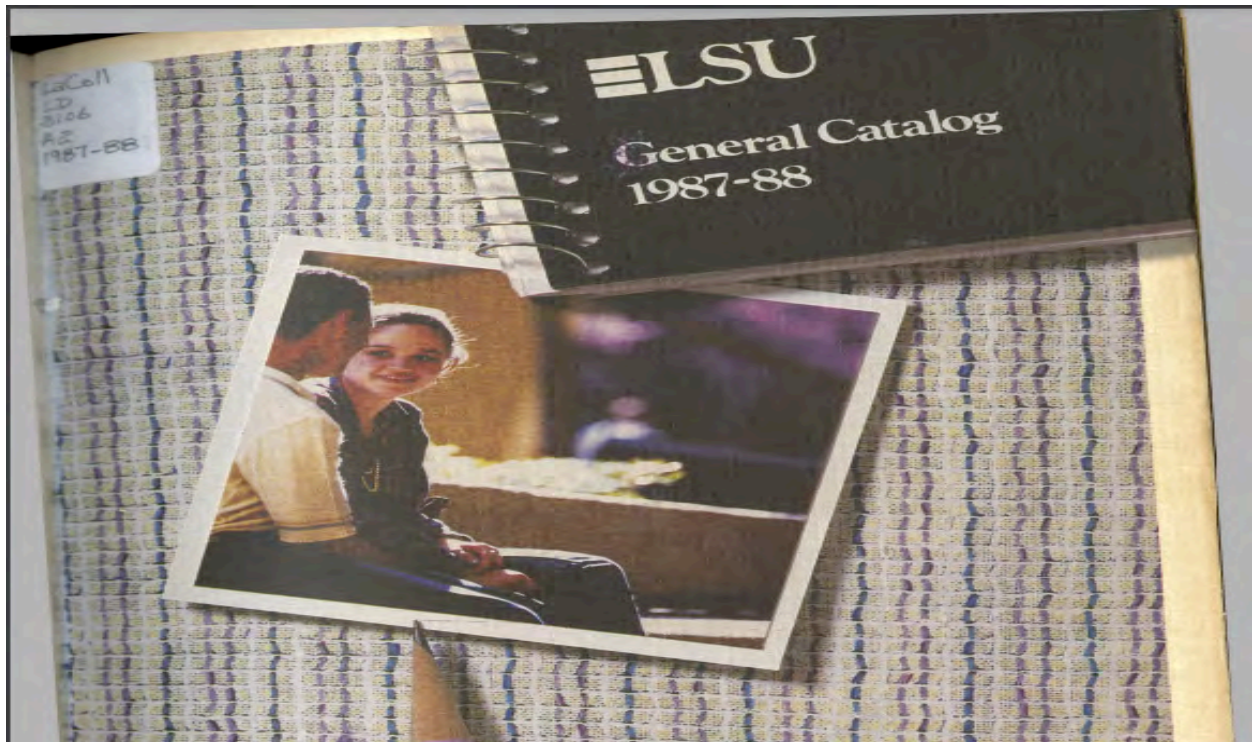


Figure 2

University Course Catalog, Examples of Course Titles – University of Idaho 2016 – 2017

AGED 454	Facilities Organization and Management	2 cr
AGED 460	Practicum: Secondary School Teaching in Agriculture	10 cr
AGED 461	Student Teaching Portfolio	2 cr
AGED 470	Proseminar in Agricultural Education	1 cr - Max 2 cr
AGED 471	Senior Capstone in Agricultural Education	1 cr
ASM 107	Beginning Welding	2 cr
ASM 203	Agricultural Shop Practices	2 cr
ASM 210	Small Engines	2 cr
ASM 407	Advanced Welding	1 cr
BIOL 115	Cells & the Evolution of Life	3 cr
BIOL 115L	Cells and the Evolution of Life Laboratory	1 cr
COMM 101	Fundamentals Public Speaking	2 cr

Results displayed in Table 1 show an analysis by five-academic-years increments, excluding the most recent increment of six-years, with the first year indicating the fall semester of that academic year, i.e., 1980 is inclusive of the 1980 – 1981 academic year. The course credit hour requirements in agricultural mechanics and related courses are provided by said increments for each institution. Credit hours with a year in parenthesis immediately below it indicates a credit hours requirement change at the beginning of that academic year, e.g., 14^a ('81) indicates a new requirement of 14 course credit hours at the beginning of the 1981 – 1982 academic year. In the case of Washington State University, regarding its four agricultural education, teacher education degree options (see Tables 1 & 2), as offered from the fall term of 1980 to the spring term of 1983, an average was calculated.

Table 1

Course Credit Hour Requirements for Agricultural Mechanics and related Courses for Undergraduate Degree Completion in Agricultural Education, Teacher Education from 1980 to 2021 at Nine 1862 Land-Grant Institutions

Years	ND State Univ.	Purdue Univ.	WV Univ.	Univ. of AZ	Univ. of ID	WA State Univ.	LA State Univ.	Auburn Univ.	Univ. of KY
1980 – 1984	^d	5 – 8 ^b	17	11 14 ^a ('81)	^d	7 ^c , 12 ^c , 22 ^c 19 ^a ('83)	6	^d	6
1985 – 1989	^d	5 – 8 ^b	17	14 15 ^a ('89)	^d	16	6 0 – 6 ^{a/b} ('88)	^d	6
1990 – 1994	12 ('94)	4	17	15 11 ^a ('93)	^d	16 7 ^a ('91)	0 – 6 ^b ^{a/d} ('91)	^d	6

1995 – 1999	10	4	17 8 – 11 ^{a/b} (‘97)	11	6 (‘96)	7	^d	6 (‘98)	6
2000 – 2004	10	4	8 – 11 ^b	14	6	7	^d	6	6
2005 – 2009	10 11 ^a (‘09)	4	8 – 11 ^b 7 ^a (‘09)	14	6	7 6 ^a (‘06)	^d	6	6
2010 – 2014	11 12 ^a (‘12)	6	7 6 ^a 8 ^a (‘11) (‘12)	9	6 7 ^a (‘12)	6	^d 0 – 15 ^{a/b} (‘11)	6	6
2015 – 2021	12	6	8	9	7 10 ^a (‘20)	6	0 – 15 ^b	6	6
Average	11.00	5.13	11.04	12.45	6.85	10.06	5.50	6.00	6.00

Note. ^aIndicates that the requirements went into effect at beginning of the academic year.

^bIndicates range of course credit hours inclusive of the universities’ required elective course credit hours. ^cIndicates multiple degree options and the various course credit hour requirements for each. ^dIndicates that course credit hour requirements were either not provided or found.

The credit hours required for degree completion from the sample over time ranged from 5.13 to 12.45. Four universities showed a decrease in credit hour requirements for agricultural mechanics and related course content over time (see Table 1). This finding aligns with prior studies that reported on the technical agricultural mechanics skills needed by beginning instructors to be successful in their first years of teaching (Albritton & Roberts, 2020; Saucier et al., 2012). Moreover, Rasty et al. (2017) found that the level of exposure to certain course topics at the post-secondary level had an impact on instructors’ perceived importance to teach agricultural mechanics content.

Washington State University was found to have offered four degree options that required different numbers of credit hours in agricultural mechanics for degree completion and teaching certification. The institution offered degrees in 1. production agriculture – mechanics, 2. production agriculture – business, 3. agricultural resources – forestry, and 4. horticulture. The latter three degrees had a requirement of 7 to 12 credit hours in agricultural mechanics or related subject areas (see Table 1). The production agriculture – mechanics degree option had courses that required a total of 22 course credit hours for degree completion.

Six universities had established a finite number of credits required for degree completion from 1980 to 2021. However, three institutions had either ranges or recommendations of credit hours for degree completion at some point from 1980 to 2021. By offering a recommendation of credit hours, and not a finite requirement, students had flexibility to choose which course concentration

areas they wished to focus prior to becoming certified to teach SBAE. Louisiana State University was an anomaly from the years of 1991 through 2009, i.e., specific course requirements were not outlined in its course catalogs. Rather a requirement of 50 credit hours in agricultural studies and approval from the student's academic advisor was specified.

As the number of course credit hours required in agricultural mechanic were reduced, the average number of courses required for degree completion were also reduced. Most courses identified in this study ranged from two to three credit hours. With recommended or required courses averaging two to three credit hours each, it could be assumed that each university averaged a recommendation or requirement of two to three courses for degree completion. However, this was not always the case (see Table 2).

Table 2
Total Courses in Agricultural Mechanics and related Courses required for Undergraduate Degree Completion in Agricultural Education, Teacher Education from 1980 to 2021 at Nine 1862 Land-Grant Institutions

Years	ND State Univ.	Purdue Univ.	WV Univ.	Univ. of AZ	Univ. of ID	WA State Univ.	LA State Univ.	Auburn Univ.	Univ. of KY
1980 – 1984	^d	3	6 ^b	4 5 ^a (’82)	^d	3 ^c , 4 ^c , 9 ^c 7 ^a (’83)	2	^d	2
1985 – 1989	^d	3	6 ^b	5	^d	6	2 2 ^{a/b} (’88)	^d	2
1990 – 1994	4 ^b (’94)	2	6 1-8 ^{a/b} (’93)	5 4 ^a (’93)	^d	6 3 ^a (’91)	2 ^b	^d	2
1995 – 1999	4 ^b	2	1-8 ^b 3 ^a (’97)	4	3 (’96)	3	2 ^b	2 (’98)	2
2000 – 2004	4 ^b	2	3	5	3	3	^d	2	2
2005 – 2009	4 ^b	2	3 2 ^a (’09)	5	3	3 2 ^a (’06)	^d	2	2
2010 – 2014	4 ^b	2	2 3 ^a (’12)	3	3 4 ^a (’12)	2	^d	2	2
2015 – 2021	4 ^b	2	3	3	4	2	^d	2	2

Average	4.00	2.25	3.75	4.30	3.33	3.85	2.00	2.00	2.00
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Note. ^aIndicates the number of courses required went into effect at the beginning of that academic year. ^bIndicates total courses, with electives, based on that university's requirements. ^cIndicates multiple degree options and various course requirements for each. ^dIndicates that the course requirements were either not provided or found.

The average number of courses required from 1980 to 2021 was 3.05 for degree completion at the nine universities studied. Before 1995, four institutions either recommended or required four to nine courses in agricultural mechanics. However, from the 1995 – 1996 academic year to the 2009 – 2010 academic year, all but West Virginia University and the University of Arizona required only two to four courses in agricultural mechanics or related courses. Beginning with the 2010 – 2011 academic year, all nine institutions would recommend or require four or fewer courses related to agricultural mechanics. Further, identifying total credit hours required for undergraduate degree completion in agricultural education, teacher education was important to understanding the importance of agricultural mechanics course-taking and space for such in the institutions' undergraduate degree programs. Findings regarding total course credit hours required for degree completion are shown in Table 3.

Table 3

Total Course Credit Hours required for Undergraduate Degree Completion in Agricultural Education, Teacher Education from 1980 to 2021 at Nine 1862 Land-Grant Institutions

Years	ND State Univ.	Purdue Univ.	WV Univ.	Univ. of AZ	Univ. of ID	WA State Univ.	LA State Univ.	Auburn Univ.	Univ. of KY
1980–1984	^c	^c	136	130	^c	120	135 136 ^a (^{'82})	^c	120
1985–1989	^c	^c	136	130	^c	130	136 144 ^a (^{'88})	^c	120 128 ^a (^{'86})
1990–1994	136 (^{'94})	^c	136	130	^c	130	144 135 ^a (^{'91})	^c	128
1995–1999	136 128 ^a (^{'96}) 135 ^a (^{'97}) 125 ^a (^{'98}) 129 ^a (^{'99})	^c	136	130 120 ^a (^{'97})	132 (^{'96})	134	135	210 ^b (^{'98})	128

2000 –2004	129 128 ^a (’03)	^c	136	120	132	134 137 ^a (’01)	135	120 125 ^a (’04)	128
2005 –2009	128 126 ^a (’06) 128 ^a (’07) 129 ^a (’09)	130 (’07)	136	120	132	137 141 ^a (’08) 126 ^a (’09)	135	125	120
2010 –2014	129 131 ^a (’13) 130 ^a (’14)	130 133 ^a (’12) 128 ^a (’14)	136 137 ^a (’12) 136 ^a (’13)	120	132 128 ^a (’14)	127 126 ^a (’11) 129 ^a (’14)	132 120 ^a (’12)	125 127 ^a (’14)	120
2015 –2021	130	128	136 120 ^a (’16) 128 ^a (’20)	120	128	129 125 ^a (’20)	120	129 123 ^a (’16)	120

Note. ^aIndicates the requirements went into effect at the beginning of the identified academic year. ^bIndicates total course credit hours required by the four-year, three-quarter academic year in place at that institution. ^cIndicates total course credit hours were either not provided or found.

Research Question 2: What topics were taught in agricultural mechanics courses for degree completion in agricultural education, teacher education at nine 1862 land-grant universities over time?

Reviewing course credit requirements for degree completion revealed different courses were offered by the universities over time. A common trend in courses included: 1. hot and cold metal working (welding), 2. introduction to agricultural mechanics topics, 3. agricultural structures, and 4. small gas engines. These courses were found to have been required by a majority of the universities from 1980 to 2021. Three of the courses identified related to specific content and the acquisition of knowledge in the content area. The course related to the teaching of agricultural mechanics, however, was mainly focused on preparing pre-service teachers in laboratory management and the teaching of agricultural mechanics and related courses, i.e., appropriate pedagogical practices.

Table 4

Topics Taught in Agricultural Mechanics Courses for Degree Completion in Agricultural Education, Teacher Education, 1980 to 2021, at Nine 1862 Land-Grant Universities

Years	ND State Univ.	Purdue Univ.	WV Univ.	Univ. of AZ	Univ. of ID	WA State Univ.	LA State Univ.	Auburn Univ.	Univ. of KY
1980–1984	b	1, 4, 9	b	2, 4, 9	b	1, 2, 3, 8, 9	1, 4	b	a
1985–1989	b	1, 4, 9	b	1, 2, 3, 4, 9	b	1, 2, 3, 4, 8, 9	1, 4 ^a	b	a
1990–1994	2, 4, 8	1, 4	b	1, 2, 3, 4, 9	b	1, 2, 3, 4, 8, 9	a ^b	b	a
1995–1999	2, 4, 8	1, 4	6, 8, 9	1, 2, 3, 4, 9	1, 2, 3	1, 2, 9	b	1, 4	a
2000–2004	2, 4, 8	1, 4	6, 8, 9	1, 2, 3, 4, 9	1, 2, 3	1, 2, 9	b	1, 2, 4	1, ^a
2005–2009	2, 4, 8	1, 4	2, 4, 8	1, 2, 3, 4, 9	1, 2, 3	1, 2, 9	b	1, 2, 4	1, ^a
2010–2014	2, 4, 8	2, 4	1, 4, 5, 9	1, 2, 3, 4	1, 2, 3	2, 9	b	1, 2, 4	1, ^a
2015–2021	2, 4, 8	2, 4	1, 4, 5, 9	1, 2, 3, 4	1, 2, 3	2, 9	b	1, 2, 4	1, ^a

Note. 1 = Introduction to Agricultural Mechanics; 2 = Welding; 3 = Small Gasoline Engines & Agricultural Power; 4 = Construction/Structures; 5 = Electricity; 6 = Plumbing & Irrigation; 7 = Agricultural Computer Systems; 8 = Electives, 9 = Teaching Agricultural Mechanics. ^aIndicates course(s) was/were not specified and subject to advisor approval. ^bIndicates information not found for required courses' topics.

Five of the nine universities experienced changes in courses from 1980 to 2021, with four course topics the most modifications. Six universities had zero to one course changes in their agricultural mechanics curriculum during the period studied. Washington State University and West Virginia University experienced the greatest change in its agricultural mechanics courses from 1980 to 2021 (see Table 4). Prior to 1995, West Virginia University required courses that included six of the nine identified course topics, the most of any institution. Louisiana State University, had the fewest specified courses after 1990, with the expectation that students would complete one or more related elective courses pending their advisor's approval (see Table 4).

Conclusions and Recommendations

The purpose of this study was to explore the course requirements at 1862 Land-Grant Universities from 1980 to 2021 regarding agricultural mechanics and related courses. Two

research questions guided this study were 1. What was the trend in course requirements related to agricultural mechanics courses for completion of vocational agriculture education, career and technical education, and agricultural education undergraduate degrees across nine 1862 land-grant universities over time? and 2. What topics were taught in agricultural mechanics courses for degree completion in agricultural education, teacher education at nine 1862 land-grant universities over time?

Regarding research question one, the average number of course credit hours in agricultural mechanics required for completion of degrees in agricultural education, teacher education had declined from 1980 to 2021, from a range of 8.33 to 11.83 credit hour requirements in 1980, to a range of 6.67 to 8.33 credit hours required for degree completion in 2021. The total number of courses required for teacher education degree completion in agricultural education, teacher education had also decreased from 1980 to 2021. The average number of courses required had been reduced from an average of 4.13 courses in 1980, to an average of 2.75 courses in 2021, as related to agricultural mechanics. Total credit hours required for degree completion in agricultural education had also lessened from an average of 128.4 to 125.0 total credit hours from 1980 to 2021. It is recommended that additional research be conducted on the different agricultural content courses, e.g., animal science, plant science, and so forth, required for degree completion in agricultural education, teacher education to assess the change or stability in required agricultural content overall.

With regard to question two, although total course credit hours related to agricultural mechanics for degree completion in agricultural education had declined, the topics of the courses required had not changed in significant ways at most universities. How much the courses' content may have changed remains an open question that warrants additional study. More than one-half of the universities had kept the same or similar course topics for degree completion in agricultural education, teacher education. This may be noteworthy in that it signifies the universities identified these courses were important aspects of teacher preparation in their programs and in their states' SBAE programs during the study's time frame. However, it is recommended that qualitative interviews be conducted with teacher educators to ascertain their rationale regarding the importance of the courses and determine how they concluded each course was a high need for degree completion in their respective states.

Implications and Discussions

This study highlighted the importance of reviewing university teacher education curricula and aligns with Tyler's (1958) assertions on educational change and curriculum theory. Through the analysis of nine systematically selected 1862 land-grant institutions, it was found that these universities, on average, were requiring fewer courses related to agricultural mechanics, course credit hours related to agricultural mechanics, and total course credit hours for degree completion in agricultural education, teacher education. Rawls (1980) foresaw student population change in SBAE programs and agricultural technology continually changing over time. Decreases in teacher preparation regarding content knowledge and teaching methods in agricultural mechanics could potentially lead to less self-efficacious instructors teaching SBAE. More needs to be known about the content of courses that teacher preparation students are taking and its relevance to the skills needed by industry, not only today but in the future.

“Even as teacher educators take on additional responsibility divergent from the aforementioned focal point of teacher preparation, the needs of middle school and high school agricultural teachers are changing” (Myers & Dyer, 2004, p. 44). Burris et al. (2005) concluded that agricultural mechanics and related curricula was one of the highest rated instructional areas in SBAE, according to the program’s students and Missouri Department of Elementary and Secondary Education. It is imperative that curricular changes in preparatory courses related to agricultural mechanics for preservice agricultural education be questioned. Technical skills in agricultural mechanics needed by entry-level SBAE teachers continues to be identified as one of the highest rated skill sets that these instructors require to perform well (Albritton & Roberts, 2020; Clemons et al., 2017; Smalley et al., 2019). Therefore, institutions courses for teacher preparation in agricultural education should align with the curricula expected to be taught in SBAE.

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Inclusion for All? Opportunities and Challenges of Including Students with Diverse Needs in FFA Activities

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The purpose of this study is to examine the experiences of North Carolina high school agriculture teachers with incorporating students with diverse needs in FFA. More specifically, this study seeks to identify and describe the challenges and suggested improvements for incorporating students with diverse needs in FFA, determine inclusionary practices teachers utilize to encourage students with diverse needs' FFA participation that teachers perceive as successful, and identify the motivations of teachers incorporating students with diverse needs in FFA. Ajzen's Theory of Planned Behavior served as the theoretical framework of this study. Agriculture teachers' attitudes towards the behavior, subjective norms, and perceived behavioral control contribute to their inclusive behavior. This qualitative phenomenological study used the interviews of eight North Carolina high school agriculture teachers as the primary method of data collection. Through these interviews the following themes emerged: the value of relationship building and the challenges with competition. It is recommended by the researcher that pre-service and in-service training be implemented related to the inclusion of students with diverse needs in FFA. Additionally, it is recommended that a taskforce be established by North Carolina FFA to develop policies and procedures to promote inclusion within FFA, specifically within competitive FFA events.

Introduction/Theoretical Framework

The Individuals with Disabilities Education Act (IDEA) mandates that the right to a free and public education is extended to eligible students with disabilities, including access to special education and related services (U.S. Department of Education, 2021). Students receiving these services are students who have been identified by educational and medical professionals as having a disability that impacts their ability to perform academically. Currently, the national average indicates 14% of all students enrolled in public schools across the US are identified as having a diverse need (Riser-Kositsky, 2021). In 2006, a study of agricultural education students in New Mexico classified 19% of students enrolled in agricultural education as students with diverse needs (Dormody et al., 2006). In North Carolina, Stair et al. similarly found that 56.1% of students with a disability completed CTE courses (Stair et al., 2010.)

Educational research has reported various benefits and challenges to inclusion of students with special needs in the mainstream classroom. Many teachers feel as though students with disabilities are a valuable part of the classroom community and are enjoyable to teach (Eiken, 2015; Giangreco et al., 1993). Additionally, teachers reported greater personal satisfaction when employing inclusionary practices and that children learn better overall when students with disabilities are included in the classroom (Davis & Layton, 2011; Eiken, 2015). However, having students with diverse needs in general education courses can cause teachers to feel more stressed and may require additional planning time (Eiken, 2015).

Specific to agricultural education, research reports mixed findings as to teachers' preparation and efficacy in working with students with special needs. Several studies found that many teachers have not received pre-service or in-service training opportunities related to working with students with diverse needs (Dormody et al., 2006; Fondren, 2019; Giffing, 2009; Greaud, 2021; Johnson et al., 2012; Ramage, 2021; Stair et al., 2010; Stair et al., 2016; Teixeira & Edwards, 2020). In contrast, Stair et al. (2016) reported that teachers feel confident about their ability to work with students with diverse needs, agreeing that they can incorporate various inclusion strategies within their program. Giffing (2009) found that a large majority of teachers understood the concept of inclusion, are in favor of inclusion of students with disabilities, and have had a positive experience working with students with diverse needs.

Research examining the inclusion of students with special needs in the experiential learning (SAE) and leadership development (FFA) components is limited. Specific to SAE, Schwager and White (1994) determined teachers recognized the benefit to students with special needs and additional encouragement for participation was needed. However, it was concluded that record keeping was an area for improvement and students with special needs rarely were recognized for their SAE programs. Other challenges included lack of parental support, socio-economic status, time needed for supervision, and students' abilities and behaviors. Johnson et al. (2012) stated that 58.9% of students enrolled in agricultural education courses in North Carolina receive special education services. According to this same study, agriculture teachers employed on 12-month contracts have positive perceptions overall toward students with diverse needs' FFA participation. However, teachers believe that students with diverse needs' ability to receive recognition for their participation was higher for SAE than FFA. Additionally, teachers believed that students' ability was a greater barrier participating in FFA activities than their supervised agricultural experience program (Johnson et al., 2012).

The Theory of Planned Behavior, developed by Icek Ajzen (1991), was used as the theoretical framework to guide this study. This framework provides understanding of the factors that contribute to behavioral intentions. According to the theory, an individual's intentions are the product of three processes: attitudes toward the behavior, subjective norms, and perceived behavioral control. Derived from Ajzen's earlier Theory of Reasoned Action, this theory is based on the premise that our intentions predict our behavior. In this model, intention serves as the cognitive function of readiness to perform a behavior.

The first predictor of intentions is one's attitude towards the behavior (Ajzen, 1991). This encompasses how one thinks or feels about the behavior, which can be positive or negative, as well as their expectations about the behavior. Subjective norms refer to the amount of social pressure felt to perform a behavior (Ajzen, 1991). Perceived behavioral control refers to how well the individual believes they can perform the behavior. Attitude and subjective norms only affect behavior through intention, however behavioral control can affect behavior independently and through the vehicle of intention.

Purpose/Objectives

The inclusion of students with diverse needs is federally mandated through legislation. However, agricultural education is unique in delivering education through the three-circle model

approach. Therefore, it is not only legally required to include students with diverse needs in the classroom, but also in the other components of the three-circle model, including FFA.

The purpose of this study is to examine the experiences of North Carolina high school agriculture teachers as they relate to the phenomenon of including students with diverse needs in FFA. The following research questions were utilized to carry out this purpose and guide the study:

1. What are inclusionary practices used by teachers to encourage the participation of students with diverse needs in FFA?
2. What are the challenges with incorporating students with diverse needs in FFA?

Methods/Procedures

In order to gain better understanding of the experiences of agricultural educators regarding the incorporation of students with diverse needs in FFA, a qualitative approach was utilized for this research. a qualitative approach was employed. Qualitative research empowers individuals to share their stories and challenges researchers to assign meaning to them (Creswell et al., 2018). More specifically, a phenomenological approach was used. Phenomenological research focuses on questions about the common human experience through the lens of a particular phenomenon (Ary et al., 2017; Creswell & Poth, 2018). In this study, the phenomenon in focus was the inclusion of students with diverse needs in FFA. Purposive sampling was utilized for this study. Interviews are typically the main form of data collection within phenomenology, as hearing responses from the individuals themselves is often a great way to gather the true experience (Creswell et al., 2018). Criterion sampling was utilized to select eight North Carolina high school agriculture teachers who had experience incorporating students with diverse needs in FFA (Creswell & Poth, 2018).

While purposive and criterion sampling were utilized, it was also important to the researcher to include maximum variation to factor multiple viewpoints of the experience (Ary et al., 2017). To achieve maximum variation, teachers were selected while stratifying to include teachers from different age groups, educational backgrounds, races, sexes, and geographies. Eleven agriculture teachers were contacted via email explaining the study, the value of their contribution, and what would be expected of them as a participant. While eleven teachers were originally selected and contacted via email, eight teachers responded to the email and agreed to participate. Keeping maximum variation in mind, North Carolina FFA has eight geographic regions. Of the eight regions, seven regions were represented. Additionally, four participants identified as male and four participants identified as female. Three different teacher preparatory institutions and a variety of age groups were reflected. One participant was an African American, while the other seven participants were white. While this is low in terms of racial diversity, this is reflective of agriculture teachers across North Carolina, as 88% of the agriculture teachers in North Carolina are white.

Interviews were conducted via Zoom due to impacts of the COVID-19 pandemic as well as the increased flexibility Zoom offered the participants and the researcher. The interview guide utilized by the researcher was pilot tested and revised based on feedback from the pilot study participants. Each participant was interviewed twice with two weeks between each interview.

This allowed for reflection on the researcher's part to ask any clarifying questions. The use of in-depth interviewing is common in phenomenological studies. Seidman (2019) proposed a phenomenological interviewing technique utilizing a three-interview strategy; however, due to accessibility of participants, two interviews were used. The interview guide was divided into two sections, one section focused on teachers' backgrounds and their experiences in the agricultural education classroom, and the other focused on teachers' experiences within FFA.

Once an interview had concluded, the researcher transcribed the interview verbatim. The researcher also gave pseudonyms to each participant when transcribing the data as to protect participants' anonymity. Once all interviews had been completed, the researcher coded the data, searching for common themes between interviews. For the credibility of the data collected, the researcher utilized member-checking procedures, sending participants their interview transcripts, as well as the common themes found through the coding process (Creswell & Poth., 2018). Open and axial coding were completed on all sixteen transcripts, two for each of the eight participants. Specifically, the highlighting feature and the ability to create tables within the documents were helpful to the researcher in coding and assigning meaning to the data collected. This coding process allowed the researcher to determine central themes across data sets that defined the experiences of the participants in this study, thus, allowing the researcher to draw conclusions. As a method of triangulation, document analysis focused on text-based artifacts to provide insight on the subject matter (Ary et al., 2017). More specifically, interview findings were triangulated and verified through North Carolina FFA Association policies and registration materials.

Results/Findings

Through the coding process, the following themes emerged:

- the value of relationship building
- the need for training
- challenges with competition

Relationship Building

When sharing about inclusionary practices used to encourage the participation of students with diverse needs in FFA, the value of relationship building emerged as a theme. Participants discussed the value of establishing and maintaining rapport with students, fellow educators, and parents.

Rachel had many students with diverse needs participate in FFA events above the chapter level. She shared many great strategies for the inclusion of students with diverse needs, including establishing class officers and encouraging participation in contests based on students' strengths. However, she explained all of her strategies and all of her inclusion efforts came back to the same idea, the value of building rapport and relationships with all students, but especially students with diverse needs:

“I think you build the rapport with them on the chapter level and then that makes them feel comfortable enough to go on other field trips or opportunities at the, like I said, the federation level, the state level and even, you know, potentially attending National

Convention.... So I think just building that foundation then sets them up to say, “Okay well, if I can do this in class, then I can, you know, participate in these activities on a federation, where I do feel comfortable enough to go with Ms. Rachel to state Convention and those types of things,” so I think, once again it all comes back to the relationship and how you know your students.” (Ra8)

Building relationships was also important to Regina, but her greatest strategy is persistence in attempting to build those relationships. She spoke of the value of individually inviting students to participate, not just providing a blanket invitation for students. She explained her strategy for including students with diverse needs in FFA:

“And then just like relationships, of like knowing my students, being like “Hey, why don't you like come for the holiday party we're having tomorrow?” like “Sugar cookies. You should come decorate sugar cookies with us.” Um, and that was how we worked on like, building our FFA up. Every year it's gotten better and it's gotten bigger, and I'm just like, “Let's get going!” (Re4)

Specific to collaborating with fellow teachers, Rachel explained the importance of the EC teachers in encouraging student involvement. One of Rachel’s favorite events is an event held at the local level called Agriculture Day, where the FFA chapter hosts all of the third graders in the county, sharing about different topics in agriculture through fun and engaging stations. She wants EC students to be able to participate in this event, so she relies on the EC teachers to make sure students with diverse needs can be a part. She stated, “...and even for my severe students, we have such a great working relationship with the EC department, we will pair an EC teacher with those kids so that they can also be a part of ag day and help as well.” (Ra9) Rachel also shared that the region in which she teaches is working to develop a career development event strictly for OCS students. She shared her excitement for this event and how the relationships built between the agriculture program and EC department will help encourage student success:

“...And then, it allows me to work with the EC teacher, because you know I went to the EC teacher and I'm like, “Okay, this is what we're going to be doing in the spring. These are the kids we have. This is what that competition is going to look like,” and they are on board, because they want their kids to be successful, so not only do you have me working with them, now, I have the EC teacher working with them to help train a career development event team.” (Ra6)

These relationships built with other teachers are for the benefit of students and sometimes extend beyond academics. Ross shared of an instance where relationship building allowed a few students to achieve a goal they set outside of the FFA and agricultural education realm, but was important to the students’ personal growth. Ross learned of a few students at his school who were deaf, and while they were of age, had not received their driver’s license. He explained about the team effort that resulted for these students to receive their license:

“But I had a few boys that hadn’t gotten their permit, and so I found out about that and I was just livid about it. They tried, I think they had tried, but they hadn’t, just the fact

nobody had worked with them on it, and so whenever I got, whenever the OCS teacher up in the other building, she got light of it, she sort of got a little more interested in it, but I started taking my class time every day pulling up those sample questions and having them to go through those sample questions that's on the driver's test for their permit, and so, before it was over with they took them over there... I didn't, the OCS teacher took them over there and of course the interpreter went and signed the test for them and they got their permit.” (Ro9)

Phoebe mentioned that gaining parental support can be difficult, but she also shared about positive results that can occur when parents are brought into the decision-making process and allow their students to participate in FFA activities:

“And sometimes parent buy-in can be more difficult, because some of these students are... they're the ones that are never active in anything. But I did see one of my parents at church on Sunday, and he was praising, because his daughter went on a field trip with us. He was like, “Your kids were so nice. She didn't have gloves and they lent her some,” and it's like, “Well yeah, because she's awesome! She's fun to have in class um, so in that case I have parent buy-in but, in other cases, it might be more difficult, to get that parent buy-in too.” (P8)

Need for training

When describing difficulties of incorporating students with diverse needs in FFA, participants identified the need for additional preparation and challenges with competition, leading to their development as themes in this study. Phoebe was very blunt when sharing her lack of preparation. When asked about the training she had received, she stated:

“As it relates to ag nothing... I just didn't... my master's was in ag ed. I don't even think I took a special ed class for my master's. I had one special ed class to get my teaching certification.” (P5)

Monica's formal training on working with students with diverse needs was also very limited. She shared her training experiences by stating:

“In all honesty, in undergrad, I don't remember having any classes as an undergraduate student on anything about IEPs or 504s, and how to reach those modifications. In graduate school, because I do have my masters, one of our master's classes was that we had to write out an IEP plan and go through the processes of a student... but I really don't remember anything from the Department of Ed or from Ag Ed that really highlighted those pieces...” (M6)

Ben shared of a particular class he took while receiving his undergraduate degree. He explained:

“They told us how to do it, so much for regular assignments, but as for ag, we didn't have anything... We didn't focus on modifications too much in ag. It was so much the teaching part and the knowledge part, making sure that you're knowledgeable in the area.” (B4)

When asked a follow up question about any in-service training he had received specifically related to agricultural education or FFA, Ben simply shook his head, indicating he had never received any training (B4).

Joey graduated from a university in North Carolina and discussed how his experience in a particular class prepared him to teach diverse learners better than most other teachers. However, he did mention a few things he wished he had more guidance on. Setting up tools used in class differently was one thing in particular, “Maybe I could set up this tool this way for this kid to use,” he said (J18). He also shared he is becoming “more aware on certain accommodations that I could do,” (J18).

Despite looking for in-service training and continuing education courses on working with diverse learners, Regina was unable to find these courses. Regina also noted that she had never had any instruction on how to work with diverse learners as it relates to the entire three-circle model:

“...I feel like I haven't seen a lot of specific diverse learner needs in ag education workshops, but across the board, I also haven't seen a ton of working with diverse learners in education at all. A lot honestly, a lot of like the professional development I get stuck having to attend, it's just like, it's pointless. It's not really anything in particular, and so...I wish there was more in general... I don't remember a lot of professional development for FFA or SAE. It's always like how to help them in the classroom.” (Re10)

Challenges with Competition

Career and Leadership Development Events (CDEs and LDEs) are competitive events where students can showcase their agricultural knowledge and agricultural/leadership skills to the test, competing against other students from other agricultural education programs. These CDEs and LDEs are often some individuals’ favorite parts of FFA, but are also by nature very competitive. The inclusion of students with diverse needs in this high-pressure environment comes with many experienced and perceived challenges as shared by the participants.

Chandler shared his experiences with students with diverse needs competing in CDEs and LDEs. While this experience was limited, it was something he considered himself open to. As far as other teachers involving students with diverse needs, he had this to say, about the competitive pressure that comes from FFA advisors:

“Um, I'd say probably a lot of teachers are hesitant to bring a kid that has IEPs to a CDE event, that mindset, “If you're not first, you're last,” so to speak.” (C8)

Based on the response from Joey, the competitive culture stems from the top down. Joey shared the story of a student that wanted to compete in a Career Development Event but had recently been diagnosed with a health condition that could cause him to faint. Because of the student learning how to deal with this newly developed condition, medical professionals had determined that for him to compete and go on this trip, Joey needed to be within sight distance of

the student. Joey emailed the individual in charge of the event to work out this accommodation so the student could compete. He shared this about the experience:

“I emailed him and he's like, “Well I don't know about this,” and he said, “Let me see what I can do,” and like the student’s family was like super involved, wanting updates and all that. I said, “Well, he don’t know about it,” and you know, “He's trying to find out some stuff,” and where that response weren't that quick, they already reached out to the specialist for the school system. They reached out to a lawyer, and they was wanting to file a case against the North Carolina FFA, because there for a while... someone in leadership said, when I talked to them about it, “Well you need to do whatever you can to make sure that youngin’ don’t go.” And I said “well, no, if he wants to go, he's gonna be there. We’re going to have to work something else out,” and I tell them I said, “You know, given the situation, this family's already talking about legal charges, I think it's in everybody's best interest that we get him there. I sure as heck ain’t telling him he ain’t going on account of his situation...” So like that was a hurdle, but anyhow... you know, like accommodations... you know, it's easy to get accommodations like here regionalized, but like when it gets to state, especially state contest, that's when it gets a little tougher and the biggest thing is just trying to tell parents, sometimes... the state staff is not, they're not miracle workers.” (J17)

A concern that Monica emphasized was that accommodations and modifications were not guaranteed to students with diverse needs. In the past, she has had students compete that have diverse needs and she has had their needs met in local and regional contests. However, at the state level, she told these students, “... if you have a written test, you may have a modification in the classroom, but you may not receive that modification at the state test,” (M8).

Phoebe shared that in a previous state she had worked in she had seen competitive FFA events organized for students with diverse needs. She proposed the idea to organize one in her region at a regional teaching meeting. Other teachers were on board with this idea, including Rachel, who mentioned this example when discussing working with other EC teachers. Phoebe stated, “We are working in {our} region to offer a CDE for our OCS students, so hopefully that helps bring more in,” (P6).

Rachel reiterated Monica’s point of providing accommodations and modifications. She wants to make sure that all students in agricultural education are experiencing all three circles of the agricultural education model to the fullest. She explained:

“I think we just have to be mindful, and I really think moving forward in the future, we just need to make sure that we're meeting those needs for those students, whether it be you know, that extended time or that read aloud, or something like that.”

Conclusions/Recommendations/Implications

While each participant of this study has their own unique style of teaching and relating to students, one common theme among inclusionary practices utilized in the classroom was the value of relationship building. This claim for value in relationship building is substantiated by a

study from Berry (2011). Seven of the eight participants indicated the importance of relationships built among three groups, students, fellow educators, and parents.

Relationships built between the agriculture teacher and the student were most commonly mentioned as being valuable to encourage participation in FFA (P7, P8, M3, M8, Re4, Ra10, Ra8). By building rapport with students, students will be more likely to trust teachers and in turn will participate in more FFA events (Ra8). Another valuable relationship with increasing participation of students with diverse needs in FFA exists between the agriculture teacher and the teacher of exceptional children. With the number of students with diverse needs involved in agricultural education, a strong relationship between the agricultural education teacher and the exceptional children's teacher can provide valuable insight into how to best meet the needs of students with diverse needs (P5). Additionally, there is value in having a team to support the student who has diverse needs so that they can participate in FFA to the fullest extent (Ra6). Relationships between teachers and the parents of students with diverse needs should also be developed and maintained to increase involvement of students with diverse needs. Parental involvement helps minimize parent concerns and helps encourage involvement of the student with diverse needs (C8; P8).

Each of the eight participants indicated a need for training on working with students with diverse needs. This need for training indicated by teachers is supported by the literature (Dormody et al., 2006; Fondren, 2019; Giffing 2009; Greaud, 2021; Johnson et al., 2012; Ramage, 2021; Stair et al., 2010; Stair et al., 2016; Teixeira et al., 2020). No participant indicated any type of training related to the other two components of the three-circle model of agricultural education, FFA and SAE. Participants indicated a desire for more professional development related to working with students with diverse needs in all facets of agricultural education.

Three-quarters of participants indicated challenges including students with diverse needs in FFA competitive events, CDEs and LDEs. Teachers described a competitive culture that discourages teachers to not bring students with diverse needs to participate in these events (C8). Additionally, participants spoke of the difficulty getting their students accommodations, especially at the state level and how sometimes those accommodations are not always met (M8; J17). Document analysis supported this idea as little to no information was found about how modifications and accommodations will be handled within FFA competitive events in North Carolina, further emphasizing a need for information related to how students with diverse needs can participate. Stair (2010) stated that ensuring modifications are provided even within FFA is especially important for inclusion of students with diverse needs in FFA.

Thinking back to the theoretical framework, participants of this study were identified as having implemented inclusionary practices. These participants indicated varying, yet similar attitudes toward including students with diverse needs. Overall, participants indicated largely positive attitudes, sharing success stories of students with diverse needs and reiterating the importance of inclusion. However, subjective norms, or social pressures, were indicated by many participants. These social pressures came from the competitive culture within FFA, specifically in career and leadership development events, as well as parents of students with diverse needs. While there were perceived difficulties with inclusion of students with diverse needs in FFA,

participants also indicated positive perceived behavioral control through their experiences with including students with diverse needs in FFA. Many participants shared that this is a process learned over time and strengthened with experience. Overall, the combination of these factors contributed to the inclusionary behavior of all participants identified in this study.

There have been many previous studies focused on the experiences of agriculture teachers incorporating students with diverse needs in the agricultural education classroom (Dormody et al., 2006; Giffing, 2009; Killingsworth, 2011; Ramage, 2021; Richardson, 2005; Stair, 2009; Stair et al., 2016; Stair et al., 2010; Teixeira & Edwards, 2020). Fewer studies have focused on students with diverse needs' involvement in FFA (Johnson et al., 2012). Due to the lack of research on agriculture teachers' experiences including students with diverse needs in the leadership development component of agricultural education, FFA, this study serves to help fill the gap in the research, specifically answering the call in Johnson's study for qualitative research to be done on the topic of including students with diverse needs in FFA (2012).

Based on the conclusions of this study, the researcher recommends that pre-service and in-service training should be implemented on the inclusion of students with diverse needs as it relates to all three circles of the agricultural education model. Additionally, North Carolina FFA State Staff should also create a task force to evaluate the inclusivity of North Carolina FFA events. This study has shown a need for more resources related to the inclusion of students with diverse needs in the complete agricultural education program. Research related to creating content and resources to be provided would fill a need. To ensure the specific needs of these students with IEPs and 504s are being met, the researcher recommends another phenomenological study with students with diverse needs as the participants of the study. Observations of students with diverse needs as they participate in FFA competitive events could provide valuable insight as well.

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A Scoping Review on the Impact of Educational Technology in Agricultural Education

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Abstract

The global competitiveness of farming systems is greatly influenced by the quality of agricultural education, of which educational technology is essential. This scoping review examined empirical studies conducted on the use of educational technologies in agricultural education between 2000 and 2022. We searched five databases in the disciplines of agriculture and education: CAB Abstracts (Ovid), AGRICOLA (EBSCO), ERIC (EBSCO), Education Source (EBSCO), and Web of Science Core Collection (Web of Science). Eighty-three articles were identified for inclusion. Major findings include: an upward trend in research publications focused on educational technology in agricultural education from 2000. The majority of the studies were carried out in the U.S., in STEM subjects (agricultural science and engineering) closely followed by the social sciences (ALEC and agricultural economics). Also, most of the articles involved undergraduate-level students; and the most used educational technology was online/distance education, followed by simulation and digital games, and multimedia and traditional technology. Finally, there was a significant relationship between the year of publication and the educational technology type ($p=.006$). This scoping review results should inform future implementations of educational technologies in agriculture education planning and curriculum development.

Keywords

Educational technology; agricultural education; scoping review; learning outcome; impact

Introduction

Agricultural education is a fundamental part of the competitiveness of farming systems worldwide. Maintaining this competitiveness requires that agricultural education integrate educational technologies into curriculum development and delivery (Alston et al., 2003). Therefore, the use of educational technologies intended to bring about dynamism and interactiveness in producing better outcomes in teaching and learning is a subject that has attracted a lot of research interest over the years, both in favor of and against the topic (Dale et al., 2004; Selwyn, 2010; Reiser & Ely, 1997; Kearsley, 1998; Malik & Agarwal, 2012). However, the increase in available educational technologies (Lai & Bower, 2019) and the recent rise in their use, more than ever due to the COVID-19 pandemic, highlighted the impact educational technologies could have in dire circumstances (Ali, 2020).

This present scoping review examined educational technologies' impact on agricultural education programs. Following Arksey and O'Malley's (2005) methodology of conducting a scoping review, our study attempted to summarize and communicate research findings, spot potential research gaps in the existing body of literature and assess the scope and character of the research activity. While researchers still debate the specific roles educational technologies have in

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agricultural education, assessing the degree of contribution of educational technologies to agricultural teaching and learning is essential. Nevertheless, beyond being a contingency plan, it is crucial to fully understand, develop, and deploy the most effective educational technologies in the appropriate learning environments for the best results. Agricultural educators have implemented educational technologies, especially in areas such as supplementing in-service Education (McCaslin & Norval, 1992); individual and group instructional purposes, and administrative purposes (Stewart & Birkenholz, 1991); increasing students' interests and retention (Murphy & Terry, 1998); and enhancing students' critical thinking (Kesley & Franke-Dvorak, 2011). However, research has yet to be conducted with the potential to summarize existing research findings and highlight potential priorities for future research and action in agricultural education.

Research Questions

The present review focuses on empirical studies about the effect of educational technology on agricultural education. We aim to examine the following aspects of the existing literature on this topic: 1) substantive features; 2) methodological features; 3) characteristics of educational technology under the context of agricultural education. The current study is guided by the following research questions:

- What are the substantive features of the included studies, such as publication information, country/region information, and instructional context?
- What are the methodological features of the included studies, such as the study type, research methods employed, data collection approaches, and sample size?
- What are the characteristics of educational technology under the context of agricultural education, such as the type of educational technology and the learning skills targeted using educational technology in agricultural education?
- What is the impact of educational technology on students' learning outcomes in agricultural education?

Methods

We conducted this scoping review using the JBI Scoping Review Framework (Peters, Godfrey, et al., 2020). First, we defined and aligned the review objective and research questions. Second, we developed the inclusion criteria to support the research questions. Third, we discussed the plan for finding, selecting, coding, and presenting the evidence. Fourth, we searched the most appropriate databases, conference proceedings, and journals. Fifth, we selected studies based on the inclusion criteria. Sixth, we extracted the relevant information from the included studies. Seventh, we analyzed the data extracted. Eighth, we descriptively presented the results. Finally, we discussed the implications of the results and provided future research directions. We used the PRISMA-ScR checklist (Tricco et al., 2018) to guide the reporting of this scoping review.

Search strategies

We searched five databases covering the disciplines of agriculture and education: CAB Abstracts (Ovid), AGRICOLA (EBSCO), ERIC (EBSCO), Education Source (EBSCO), and Web of Science Core Collection (Web of Science). The first two authors and a research librarian, developed the search strategy in CAB Abstracts (Ovid) and modified the search for each of the other four databases. The date range limiter of January 2000 to September 2022 was added to each database search. The searches were run on September 20, 2022.

Based on the research questions, two core concepts were identified: educational technology and agricultural education. Synonyms as well as subject terms, which are unique to each database, were identified for the two concepts. The synonyms and subject terms for each concept were joined with “or” to create a concept cluster, and the two concept clusters were joined with “and.” See Appendix A for the full search strategy for CAB Abstracts. The results from the database searches were uploaded into Covidence for duplicate removal and screening. We also searched the most recent online issues of NACTA (North American Colleges and Teachers of Agriculture) Journal and Journal of International Agricultural and Extension Education on September 26, 2022 as these were not indexed in the databases on the date of the search.

Inclusion and exclusion criteria

Included studies followed the six criteria.

1. The included studies examined the effect of educational technology on agricultural education. Articles were excluded if they were not about educational technology, or if they were not within the agricultural education context, or if they did not examine the effect of educational technology on agricultural education.
2. The included studies had to be published in a journal, or as a conference proceeding or dissertation from January 1, 2000, to September 20, 2022, and available in English. We chose this time frame because we aimed to include the most recent studies and that educational technology has witnessed rapid development since 2000 (Alston & English, 2007; Wingard, 2004; Wheeler & Jarboe, 2001) in agricultural education. Secondary data analysis, literature reviews, book reviews, book chapters, and reports were excluded.
3. Included studies had to report assessment of educational technology’s impact/effect on agricultural education. Articles were excluded if they were reports about a course or workshop about this topic. Articles that generally discussed the trends or the importance of educational technology in agricultural education were excluded.
4. Included studies needed to report detailed information on the effect of educational technology on agricultural education, which included the sample size, experimental design, detailed results (either quantitative or qualitative), etc. Abstract proposals on this topic were excluded.
5. Included studies were conducted in agricultural education, which includes formal education (from secondary to higher education), or professional development and certifications (certificate program or distance program), or some educational programs carried out by agricultural students under supervision in the field. Articles were excluded if they conducted studies in agricultural extension or in agricultural industries.

Coding scheme

We designed a detailed and comprehensive coding scheme to organize study information and facilitate data extraction. We covered the included studies’ substantive and methodological features through the systematic coding form. Since the focus of the study was the impact of educational technology on learning outcomes for agricultural education, we attempted to categorize the characteristics of the educational technology.

Substantive features of the studies

Substantive features of the studies included article type, publication information, country/region of the study, subjects, and educational level. We also coded the specific subjects that utilize

educational technology in agricultural education. We coded the subjects as agricultural science including agronomy, agronomy, soil science, horticulture, agriculture and life sciences, etc., agricultural engineering such as agricultural mechanics, and agricultural engineering, etc., agricultural leadership, education, and communication as ALEC, and agricultural economics and finance. The education levels included in the studies were divided by secondary (7-12), undergraduate, graduate, professional education (professional and certificate agricultural education programs), and faculty and staff. If there were more than two educational levels, it was coded as mixed. If it was conducted in higher education but did not specify whether it was in undergraduate or graduate, we coded it as higher education not specified.

Methodological features of the studies

The methodological features of the studies included research methods, sample size, data collection approaches, and type of instrument. Research methods were categorized in three ways: quantitative, qualitative, or mixed methods. Data collection approaches included survey/questionnaire, interview, test assessment which included homework assignment, GPA of the participants, examination scores, etc., focus group, digital/audiovisual/photo recordings, and student evaluation. If the study applied more than one approach, it was coded as mixed data collection. For the studies employing survey/questionnaire and test/assessment, we documented whether the researchers designed the original instrument, adapted an existing instrument(s), or used standardized instrument(s). Furthermore, we also documented the information of the sample size.

Characteristics of educational technology in agricultural education

We categorized the characteristics of educational technology utilized in agricultural education. Educational technology in agricultural education in the included studies mainly fell into the following categories: online/distance education, simulation/digital games, multimedia & traditional technologies such as utilization of LCD, powerpoints, video, flipped charts, and projectors, etc., mobile technology including cellphones & tablet PC, social media (blogging), flipped classroom, GPS/ GIS, and virtual learning. If the study employed more than one type of technology, we coded it as mixed.

Our criteria for intensity were based on Cheung and Slavin (2012) and Xu et al. (2019), with a cutoff of 75 minutes per week. Strong intensity occurred when the technology was used for more than 75 minutes per week. All other intensities were categorized as weak. In addition, we believe that the amount of time an educational technology is used during the semester or year may play a vital role in its effects on learning outcomes in agricultural education. Therefore, we also coded the duration of the intervention. A duration of three months was the cutoff (Xu et al., 2019) because the typical K-12 school year is 180 days, and three months represents at least half of the year. If an educational technology program was used for more than three months, it was coded as long. Durations less than three months were coded as short.

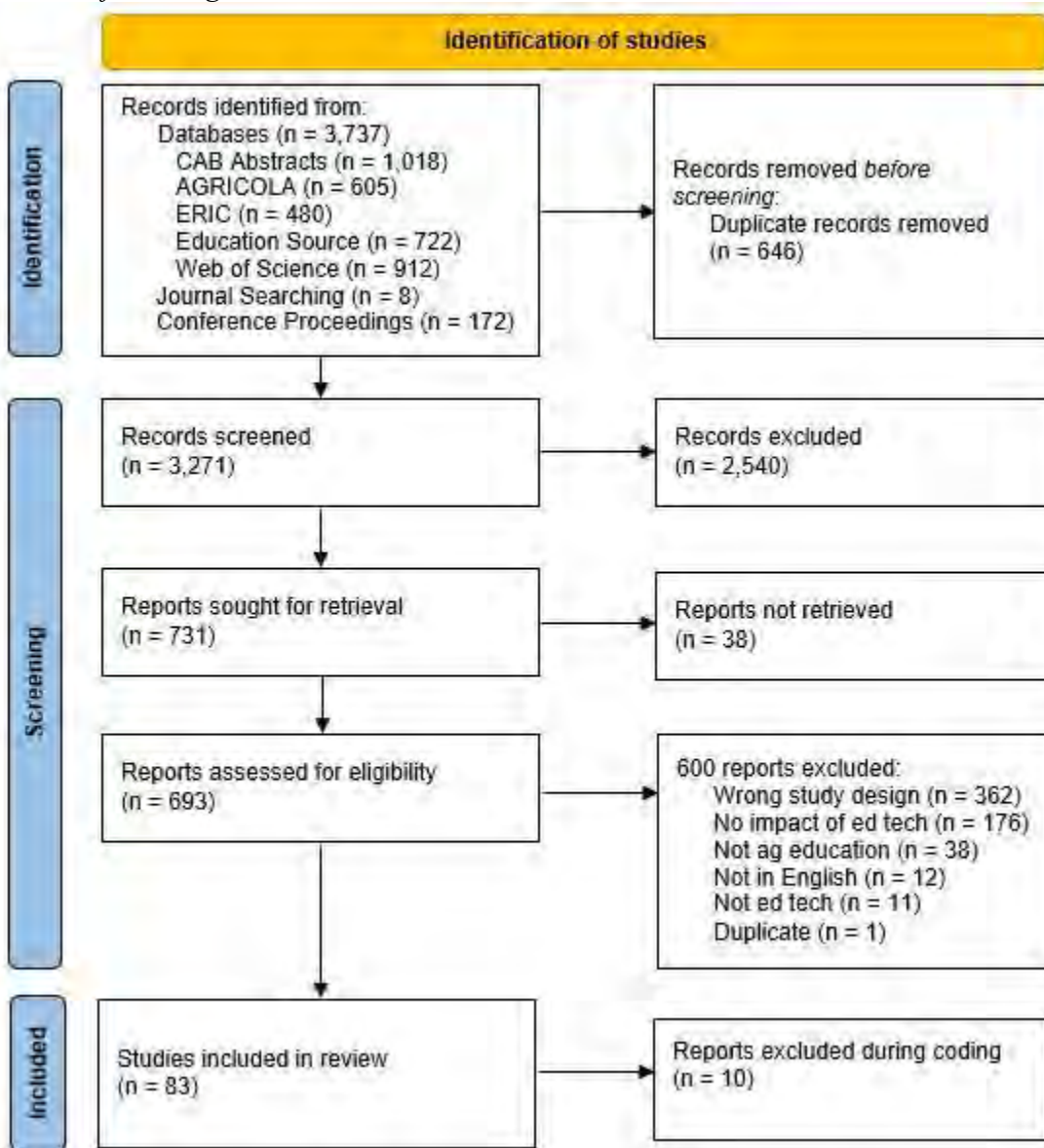
We also coded whether the studies had positive or negative effects on learning outcomes in agricultural education. If no effects were found, we coded them as nonsignificant. For some studies with mixed effects, we coded them as mixed.

Data collection and data analysis

The search and screening process to identify eligible studies is shown in Figure 1. After deduplication, 3271 unique references were screened for eligibility. First, the first two authors screened the article titles and abstracts using the inclusion/exclusion criteria. After the first round of screening, more than 77% of the articles were excluded. Second, the first two authors independently screened the full text of the remaining 731 articles. After the full text screening, 93 articles were eligible for inclusion in our review. In the coding process, another 10 articles were excluded for various reasons (e.g., no effect examined; no detailed information about the study design, etc.). Therefore, 83 articles were included in the final coding stage.

Figure 1

PRISMA flow diagram



The first two authors independently coded the first 10 articles and developed the coding scheme for the current scoping review. Next, the first four authors used the developed coding scheme to code the articles in Microsoft Excel. The initial coding of the 83 articles was done independently in order to calibrate the coding. For the initial round of coding, we achieved an inter-rater reliability of 85.39%. When the authors had a dispute, the first author was reached to resolve the disagreement. Eventually, 100% agreement about the coding was reached. We conducted descriptive statistical analyses to answer our research questions.

Results and discussion

Substantive features of the studies

The analysis of the publication year shows an upward trend in research publications focused on educational technology in agricultural education from the year 2000. Among the 83 included articles, 33 articles (39.76%) were published between 2000-2010 (11 years) while 50 articles (60.24%) were published between 2011-2022 (12 years).

Among the 83 articles identified, the majority of articles ($n=72$, 86.75%) were from 22 peer-reviewed journals while the remaining 11 articles (13.25%) were from six conferences such as the American Association for Agricultural Education (AAAE) regional (Western, Northcentral and Southern) and national conferences, XXVI IHC-IVth Int. Symp. Taxonomy of Cultivated Plants, and the International Scientific Conference eLearning and Software for Education. The majority of the identified journals ($n=14/22$, 63.64%) appeared only once while the other eight journals ($n=8/22$, 35.36%) appeared at least twice. The number of articles per journal/conference are listed in Table 1.

Table 1

Journals and Conferences of Included Articles

Journal	Number of articles included in the review
NACTA	23
Journal of Agricultural Education (JAE)	18
Natural Sciences Education	4
Journal of Natural Resources and Life Sciences Education	4
Journal of International Agricultural and Extension Education (JIAEE)	3
Review of Agricultural Economics (Applied Economic Perspectives and Policy)	2
Journal of Applied Communications	2
HortTechnology	2

Other journals (e.g., International e-Journal of Advances in Education, Applied Engineering in Agriculture, and The American Journal of Distance Education) 14*

Conferences	Number of articles included in the review
AAAE National Conference	4
AAAE Western Region	3
AAAE North Central Region	1
AAAE Southern Region	1
XXVI IHC-IVth Int. Symp. Taxonomy of Cultivated Plants	1
International Scientific Conference on eLearning and Software for Education	1

Note: *other articles only appear once but in separate journals

The majority of studies in the identified articles were conducted in the U.S. ($n=69$, 83.13%) while the other country that appeared more than once was Italy ($n=2$, 2.41%). The other 10 articles (12.05%) which were studies conducted in Malaysia, Ireland, Nigeria, South Korea, India, Ethiopia, Romania, South Africa, France and Denmark only appeared once. Two articles (2.41%) were conducted or examined under the context of more than one country and/or region.

With regards to the subjects or fields of agricultural education where various educational technologies have been deployed in the identified studies, 39 articles (46.99%) were in agricultural science subjects, while 21 articles (25.30%) covered ALEC subjects. Another 10 articles (12.05%) covered agricultural engineering subjects as well as the other 11 articles (13.25%) covering agricultural economics and finance subjects. Lastly, two articles (2.41%) covered mixed subject areas in agricultural education as identified by the studies. The majority of the publications on the topic of educational technology in agricultural education were conducted in STEM subjects (agricultural science and engineering, 59.04%) while we also witnessed a large number of articles conducted in social science (ALEC and agricultural economics, $n=32$, 38.55%) under the context of agricultural education, which indicated that educational technology had been employed widely in the field of agricultural education. However, only 2.41% of the publications covered mixed subjects for the current topic. Since multidisciplinary approach has become dominant and necessary in agricultural sciences and education, we expect to see more studies in the future to cover mixed subjects for the topic of educational technology in agricultural education (De Luca, et al., 2015; Lockeretz, 1991).

The educational levels of the participants in the studies cut across different levels as identified by the various articles. Majority of the articles identified were carried out at the undergraduate levels ($n=50$, 60.24%). Other educational levels include graduate ($n=8$, 9.64%), secondary education ($n=8$, 9.64%), faculty and staff ($n=2$, 2.41%) and professional/certificate/adult

learners (n=1, 1.20%). Two articles (2.41%) did not specify the higher education level while the remaining 12 articles (14.46%) covered mixed educational levels.

Methodological features of the studies

Majority (n= 61, 73.49%) of the included studies adopted a quantitative method in their research design, followed by another 12 articles (14.46%) that utilized a mixed-methods approach while nine articles (10.85%) used a qualitative method approach. For one of the articles (1.20%), it was difficult to identify clearly what method was used for the study. Both quantitative and qualitative methods can provide insights to research studies (Heyvaert et al., 2013; McKim, 2017), future studies in the field can employ more mixed methods study designs to investigate the effect of educational technology in the field of agricultural education.

We further coded whether the authors used statistical analysis in their studies, results revealed that 59 articles (71.08%) employed statistical analysis while 24 articles (28.92%) did not. Out of the 73 articles that used either quantitative or mixed methods in the research design, 38 (52.05%) had a control group while the remaining 35 articles (47.95%) did not. The design and development of intervention studies is a vital aspect of evidence-based research. Literature suggests that intervention studies containing the control group is the rigorous intervention study that can help best assess the effectiveness of the intervention (Fraser & Galinsky, 2010) so we recommend that future studies attempt to have control groups in their study design if possible.

Since our review focused on the impact of educational technology on agricultural education and its learning outcomes, and majority of studies employed a quantitative/mixed methodology (n=73, 87.95%) , we adhered to the recommended quantitative research guidelines: a large sample size has more than 250 participants, medium sample sizes between 100-250, and small sample contain less than 100 participants (Cheung & Slavin, 2012; Slavin & Smith, 2009; Xu et al., 2019, 2020). In accordance with these sample size indicators, 44 articles (53.01%) were identified as having small sample sizes, 22 articles (26.51%) had medium sample sizes and only 11 (13.25%) had large sample sizes. In addition, six articles (7.23%) either did not explicitly state their sample sizes or it was difficult to deduce the sample sizes from their research designs and hence were not included. This indicates that researchers in the field should attempt to recruit more participants to obtain a larger sample size (or to include the information about sample size) in order to examine the effect of educational technology in agricultural education.

The type of data collection approaches was also identified for the current review. Among the 83 included articles, 31 articles (37.35%) utilized test assessments including examination/homework assignments/GPA as the method of data collection. Another 27 articles (32.53%) used mixed methods of data collection while 20 articles (24.11%) used surveys/questionnaires. Other data collection methods used include digital/audiovisual/photo recordings (n= 2, 2.41%), focus group (n= 1, 1.20%), interviews (n= 1, 1.20%) and student evaluation (n= 1, 1.20%). It is understandable that the number one data collection approach for the type of study is assessment since we limited our scope to the effect of educational technology in agricultural education. We also noticed that surveys/questionnaires are a very popular data collection method for researchers to collect data in the field.

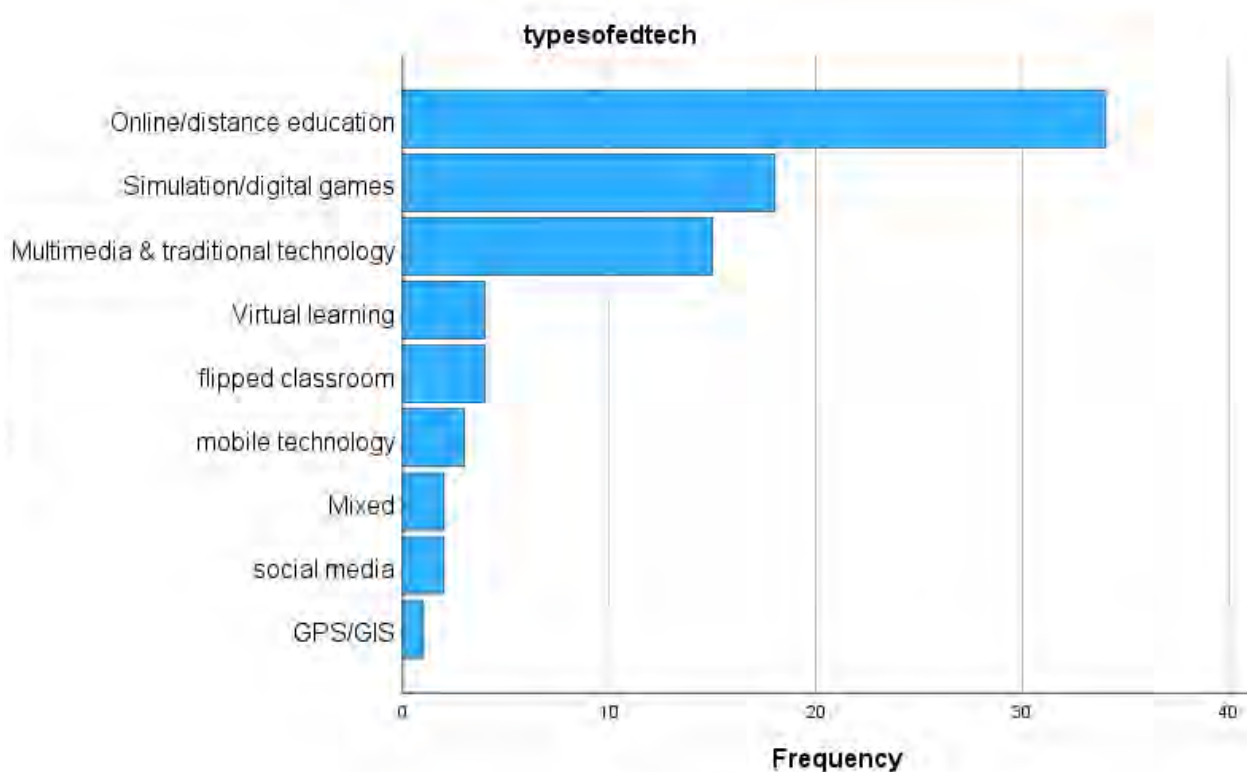
We further coded the studies that employed assessments, or surveys/questions to identify whether the instrument the researchers used are standardized or researcher-designed. Among the 74 articles that used assessments and surveys/questionnaires studies, the majority of the articles ($n=64/74$, 86.49%) utilized researcher-designed instruments, eight articles (10.81%) used standardized instruments while two articles (2.70%) utilized a combination of both. Future researchers can put more effort into constructing standardized instruments to measure the effectiveness of educational technology in agricultural education.

Characteristics of educational technology in agricultural education

A number of educational technologies were identified from the 83 included articles. The most used educational technology in agricultural education as identified in these articles was online/distance education ($n=34$, 40.96%), followed by simulation and digital games ($n=18$, 21.69%) and then multimedia and traditional technology ($n=15$, 18.08%). Also, four articles (4.82%) used flipped classrooms, another four articles (4.82%) used virtual learning, three articles (3.61%) used mobile technology, two articles (2.41%) used social media and only one article (1.20%) used GPS/GIS. Two articles (2.41%) also used mixed technology with a combination of more than one educational technology.

Figure 2.

Distribution of Articles by Educational Technology Used



We followed Cheung and Slavin's (2012) and Xu et al. (2019) criteria for educational technology program's intensity, with a cutoff of 75 minutes per week. When the technology program was used more than 75 minutes per week, we coded as strong ($n=14$, 16.87%). Otherwise, it was categorized as weak ($n=7$, 8.43%). There were 62 articles (74.70%) which did

not provide information about the program intensity (indicated by missing). For the educational technology program's duration, we used three months because three months represent at least half of the school year with a typical school year of 180 days. When the program lasted longer than three months, we categorized it as long duration (n=44, 53.01%). Otherwise, we categorize it as short duration (n=21, 25.30%). Eighteen studies (21.69%) included in the current scoping review did not provide relevant information on duration. Previous studies indicated that educational technology program's intensity and duration have fundamental impact on the effect of the programs (Cheung & Slavin, 2013; Xu et. al, 2019), we highly recommend that the future studies provide the relevant information in the studies in order to measure the effectiveness of educational technology in agricultural education.

In the current scoping review, 47 articles (56.63%) recorded positive learning outcomes from the use of educational technology (e.g., Allen et al., 2019; Wickenhauser et al., 2020). Another 19 articles (22.89%) recorded a non-significant result. Only three articles (3.61%) recorded negative learning outcomes from their studies (e.g., Teolis et al., 2007).

A Cross Tabulation analysis and a Chi-Square Test was performed to assess the relationship between the year of publication of the identified articles and educational technology type (Table 2). There was a significant relationship between the two variables, $\chi^2(8, n=83) = 21.59, p = .006$, indicating that educational technology types are statistically different between years of publication. Though online/distance education is dominant through the years, the proportion of this type of educational technology becomes less prominent when educational technology types are diversified (from 22 in 2000-2010 to 12 in 2011-2022).

From the results of the cross tabulation analysis, we witnessed an increase in the educational technology type in simulation/digital games between the years (from four in 2000-2010 to 14 in 2011-2022), and also more diversified educational technology types in the years between 2011-2022 including mobile technology, social media, flipped classroom, and virtual learning.

Whilst simulations and digital games articles published between 2000 and 2010 focused on different agricultural subjects, including human nutrition (Dunn et al., 2006), bovine reproduction (Perry & Smith, 2004), and crop physiology (Jovanovic et al., 2000; Wery & Lecoeur, 2000), all evaluated the impact of these educational technologies by assessing changes in the level of knowledge of students. This is a positive change within the field of agricultural education, as Vickery et al. (2018) indicated in their analysis that only 57% of the studies included in their analysis investigated the impact of educational technology on students' learning.

Table 2

Cross tabulation of Year of Publication and Educational Technology

Educational Technology	Year of Publication		χ^2
	2000-2010	2011-2022	
Online/distance education	22	12	21.587**
Simulation/digital games	4	14	
Multimedia & traditional technology	5	10	
Mobile technology	0	3	
Social media	0	2	
Flipped Classroom	0	4	

GPS/GIS	1	0
Virtual learning	0	4
Mixed	1	1

Note: $\chi^2(8, n=83) = 21.587, p = .006$

A Cross Tabulation analysis and a Chi-Square Test was performed to assess the relationship between the subjects and educational technology type (Table 3). Results indicated that there was no significant relationship between the two variables. $\chi^2(32, n=83) = 32.74, p = .431$. Though we did not detect the statistical significance of these two variables, we witnessed some differences between the types of educational technology and subjects. One obvious trend in the application of educational technology in different subjects is that we recognized more applications of simulation/digital games in agricultural science and engineering subjects (15 publications respectively) than in the agricultural social sciences fields (3 publications).

Table 3.
Cross Tabulation of Subjects and Educational Technology Type

Subjects	Type of Educational Technology									χ^2
	Online/distance education	Simulation/digital games	Multimedia & Traditional Technology	Mobile Technology	Social media	Flipped Classroom	GPS/GIS	Virtual Learning	Mixed	
Agricultural Science	19	9	6	1	1	1	1	1	0	32.74
ALEC	7	2	5	1	0	2	0	3	1	
Agricultural Economics and Finance	6	1	2	0	1	0	0	0	1	
Agricultural Engineering	1	6	1	1	0	1	0	0	0	
Mixed	1	0	1	0	0	0	0	0	0	

Note: $\chi^2(32, n=83) = 32.74, p = .431$

Conclusions

Agricultural Education prepares professionals who contribute to ensuring the supply of food, energy, and fiber worldwide. Historically, educational technologies have been integrated into agricultural education programs, vital for student development at all academic levels (Talbert et al., 2022). This paper presents the results of a scoping review on the impact of educational technologies on agricultural education between 2000 and 2022. The 83 journal and conference articles spanned multiple geographic areas, academic/disciplinary areas, and educational levels. Although most of the research on educational technologies in agricultural education has been conducted in the United States, the results showed, although in considerably less quantity, existing studies in other regions of the world.

Some trends in the results of this scoping review correspond to recent changes or events that have modified agricultural education systems. For example, both the predominance of online/distance education over other educational technologies and the increase in research on educational technologies in recent years could be explained by the growing interest in diversifying the academic offer through virtual platforms; and by the dependence of educational

systems on online/distance education generated by the COVID-19 pandemic (Al Lily et al., 2020; Ali, 2020; Clark, 2020).

This study aims to support educators, researchers, and the agricultural education sector to identify research priorities and more effectively implement educational technologies in agricultural education programs. To achieve this, we recommend promoting educational technology research in regions with limited data, primarily low- and middle-income countries where educational technologies have historically been less effectively implemented (Tadesse & Muluye, 2020). In settings with less access to educational technologies, we recommend that researchers consider the feasibility and potential of the technology in question. We also recommend investigating the effectiveness of differentiated educational technologies across educational levels and academic/disciplinary areas within agricultural education programs. Furthermore, since the results demonstrate more research on the impacts of educational technologies in agricultural sciences and engineering subjects compared to agricultural social sciences subjects, future research should emphasize evaluating educational technologies in the latter set of subjects.

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Determining Professional Development Needs of School-Based Agricultural Education Teachers for Working with English Language Learners

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Abstract

English Language Learners (ELLs) are one of the fastest growing student populations in the United States. However, teachers, including school-based agricultural education (SBAE) teachers, report being underprepared to teach ELLs. Skills needed to teach ELLs were identified and categorized using Coady et al.'s model for preparing effective teachers of ELLs. The purpose of this study was to describe current SBAE teacher perceptions and needs related to strategies for working with ELLs in the agriculture classroom. This was accomplished through a Borich needs assessment using an online survey of Texas SBAE teachers. Less than half of respondents reported receiving training in 37 out of the 41 ELL teaching strategies. The greatest professional development need was communication with ELLs and their parents. The results of this study were consistent with previous research, which reported that SBAE teachers received little training in working with ELL students. When examining teachers' competence for working with ELL students, there were no teaching and learning strategies where teachers felt more than somewhat competent. Professional development should be provided to help improve teachers' communication with ELL students and their parents, and teacher preparation programs should provide experiences to allow preservice teachers to work with ELL students.

Introduction

The number of English Language Learners (ELLs) in U.S. classrooms has drastically increased in recent years. The term English Language Learner refers to students whose first language is not English, and as of 2015 there were 4.8 million ELL students, with five states seeing increases of over 40% between 2009 and 2015 (USDOE, 2022). ELL students possess diverse backgrounds, languages, socioeconomic statuses, family support, literacy levels, and cognitive abilities (Short & Echevarria, 2005), however, the vast majority (77.8%) of ELL students in the United States have identified as Hispanic or Latino, and Spanish was the most common language spoken at home (USDOE, 2022).

Because of their lack of English proficiency, many ELL students struggle to meet academic demands (Roy-Campbell, 2013), and many have a pattern of underachievement and low retention rates (Coady et al., 2011; Khong & Saito, 2014). In 2000 the dropout rate for Latino and Hispanic youth was 22.4%, more than twice the national average (Janzen, 2008). While the causes for underachievement are multidimensional, one critical issue has been lack of teacher preparation (Janzen, 2008). Nearly 90% of teachers have worked with ELL students, however, less than 30% felt prepared to teach ELL students (Barajas et al., 2020; Karabenick & Noda,

2004). Moreover, school-based agricultural education (SBAE) teachers have also reported a lack of confidence for educating and developing educationally relevant relationships with ELL students (Roy-Campbell, 2013; Salem, 2021; Vommi & LaVergne, 2016). When teachers lack the confidence to educate ELL students, they will be less likely to meet the students' needs (Hansen-Thomas et al., 2014).

Teachers need specific preparation and professional development to educate ELL students effectively and equitably (Short & Echevarria, 2005). However, little professional development designed to assist teachers who work with ELL students has been available (Gándara et al., 2005). Only eight percent of states require specific ELL training, thus leading to underprepared teachers with a lack of foundational knowledge surrounding ELL issues (Coady et al., 2011; Hansen-Thomas et al., 2014; Roy-Campbell, 2013). Khong and Saito (2014) illuminated the need to better prepare teachers for working with ELL students, stating, "The biggest institutional obstacle for ELL teachers has been inadequate in-service and pre-service training" (p. 214). Preservice teachers who worked with ELL students during student teaching indicated this was the most helpful component of their preservice teacher preparation program and these experiences were positively related to their ability to effectively teach ELL students (Coady et al., 2011). According to Hansen-Thomas et al. (2014), preservice and current educators need to have the opportunity to develop a specialized set of skills and teaching strategies to be more effective in working with ELL populations. Nonetheless, teachers' lack of professional development regarding working with ELLs has resulted in many teachers depending upon their own knowledge gained through personal experience working with students (Khong & Saito, 2014).

In addition to teacher preparation, having teachers who represent students' diverse backgrounds is important. However, the rapid growth of student linguistic and cultural diversity in our educational system has not resulted in a proportionate increase in representation of teachers with similar linguistic and cultural backgrounds (Hansen-Thomas et al., 2014). According to the National Center for Education Statistics (2022), the K-12 teacher population has remained overwhelmingly White. The trend has been similar in SBAE where Vincent et al. (2012) reported that teacher demographics have not kept pace with the changes in student demographics. This is unfortunate, as students showed greater academic advances when taught by a teacher who spoke their same language versus those students with teachers who lacked bilingual/multilingual abilities (Gándara et al., 2005).

While ELL students have been one of the fastest growing populations in the United States, there has been a lack of exploration regarding the ELL student experience in SBAE (Vincent & Torres, 2015). According to the American Association for Agricultural Education's ([AAAE] 2017) Standards for SBAE Teacher Preparation Programs, SBAE teachers should create fair and equitable classroom environments that build positive rapport with students, parents, stakeholders, and community members. Nevertheless, ELL students face unique barriers to participation in SBAE because of social perceptions and unawareness of classroom and FFA program norms (Barajas et al., 2020). Vommi and LaVergne (2016) reported that due to lack of preparation,

many SBAE teachers indicated a desire to receive training working with English Language Learners. Consequently, working with ELL students is an area SBAE teacher preparation programs and professional development providers should address. However, for SBAE teacher preparation programs and professional development providers to make progress in this area, the specific skills teachers need to work with ELL students must be identified, thus, leading to the need for this study.

Literature Review

To identify skills needed by SBAE teachers for working with ELLs, a review of literature was conducted revealing a multitude of skills teachers lacked or skills that should be taught during teacher preparation programs or professional development. Skills related to communicating with ELL students and their parents were the most frequently cited challenges for teachers (Gándara et al., 2005; Hansen-Thomas et al., 2014; Khong & Saito, 2014; Salem, 2021). Other communication challenges included understanding the speech and writing of ELLs, changing the negative perceptions of SBAE among parents of ELLs, and speaking the language of ELLs (Barajas et al., 2021; Gándara et al., 2005; Salem, 2021). A study of early career SBAE teachers in Texas also found that participants need to strengthen skills in developing relationships with ELL students, developing relationships with bilingual or multilingual colleagues, using translation software, creating culturally aware and inclusive lessons, and providing language-centric experiences for ELL students (Salem, 2021).

Lucas and Grinberg (2008) recommended that teachers be able to determine ELL students' literacy levels, the language spoken in the students' home, and English proficiency level. However, teachers reported challenges accomplishing these tasks since ELL students possess a wide range of academic and English language proficiencies (Gándara et al., 2005). Furthermore, teachers should familiarize themselves with students' cultural background and first language spoken (Lucas & Grinberg, 2008; Lucas & Villegas, 2011). Additional challenges included the time required to teach ELL students the subject matter and English language proficiency while finding tools to teach and assess ELLs (Gándara et al., 2005; Khong & Saito, 2013).

According to Hansen-Thomas et al. (2014), specialized skills are needed to engage ELL students in the classroom and accelerate their literacy development. Short and Echevarria (2004) recommended teachers in all subject areas identify the language demands of their course content, plan language objectives for all lessons, emphasize academic vocabulary development for ELLs, activate and strengthen background knowledge of ELLs, and provide feedback on ELL students' language use in class. Related to literacy development, being able to scaffold English language learning using a variety of strategies is also a skill needed by teachers of ELLs (Lucas & Villegas, 2011; Villegas et al., 2018).

Specific to SBAE, Barajas et al. (2020) pointed out several issues regarding the teaching of ELL students. First, they reported that ELL students perceived an unwelcoming environment in SBAE classrooms toward Latin culture (Barajas et al., 2020). They also suggested that SBAE teachers

needed to understand social perceptions and patterns of ELLs in the classroom, manage seating proximity of ELLs to the teacher, and encourage social participation of ELLs with others in the classroom.

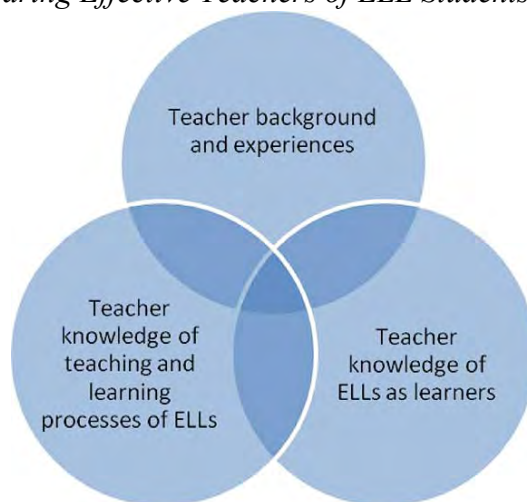
Several studies provided characteristics possessed by teachers who have been considered high quality teachers of ELL students. These teachers provide opportunities for oral and written language practice (Verplaetse, 2008), develop materials to aid ELL students' comprehension and modify lesson plans to meet the individual needs of ELL students (Brower & Korthagen, 2005; Menken & Antuñez, 2001), assess the language and literacy development of ELL students (Abedi et al., 2004; Brower & Korthagen, 2005), implement cooperative learning and grouping strategies between ELLs and other classroom students (Brower & Korthagen, 2005), and identify the cultural and linguistic identities needed to facilitate learning (Cummins, 2001).

Theoretical/Conceptual Framework

This study was grounded in Self-Efficacy Theory (Bandura, 1986) and Coady et al.'s (2011) conceptual Model for Preparing Effective Teachers of ELL Students. Coady et al. (2011) based their model (Figure 1) in the literature concerning pedagogical skills, dispositions, and knowledge possessed by quality teachers of ELL students. They proposed that the preparation of effective teachers of ELL students could be informed and influenced by three broad, interrelated dimensions including, (a) teacher preparation, background, and experiences; (b) teacher knowledge of teaching and learning processes with ELLs; and (c) teacher knowledge of ELL students.

Figure 1

Conceptual Model for Preparing Effective Teachers of ELL Students (Coady et al., 2011)



The first dimension, teacher preparation, background, and experiences, focused on two specific areas of teachers' background, including professional and personal experiences (Coady et al., 2011). Coady et al. touted the importance of ELL-specific training received during preservice teacher programs, stating that teachers who have received such training and "obtain the

professional preparation necessary to learn their craft can make informed pedagogical decisions and advocate for their ELLs” (p. 225). Subsequently, Coady et al. indicated that this first dimension included teachers’ personal experiences such as, fluency in a foreign language, international travel, sustained intercultural interactions, open-mindedness, and positive attitudes. However, for the purpose of this study, participants were only asked about their professional background related to training in specific skills connected with teaching ELL students.

The second dimension, knowledge of teaching and learning processes with ELLs, described teachers’ experience with and understanding of various pedagogical skills related to teaching ELLs. Skills within this dimension included teachers’ understanding of languages and language acquisition (Wong-Fillmore & Snow, 2000); ability to make lessons linguistically accessible (Lucas & Grinberg, 2008); expertise in developing materials and modifying lessons for ELL students (Brower & Korthagen, 2005; Menken & Antuñez, 2001); capacity to utilize strategic cooperative learning and grouping tactics (Brower & Korthagen, 2005); and proficiency at providing opportunities for oral and written language practice (Verplaetse, 2008) and assessing language and literacy development (Brower & Korthagen, 2005). Additional skills in this area consisted of teachers’ ability to integrate intercultural competence and cross-cultural communication into their teaching (Lucas & Grinberg, 2008).

The last dimension, teacher knowledge of ELL students, characterized the personal knowledge teachers possess about their ELL students, including their culture, first language, language spoken at home, written and oral proficiency levels with English, and literacy levels (Lucas & Grinberg, 2008). Cholewa (2009) suggested that, while effective teachers of ELL students may not know and understand the aspects regarding all students’ cultures and language, they are willing to learn and connect their curriculum and teaching to each student individually.

Bandura (1986) described self-efficacy as an individual’s level of confidence in their ability to perform a certain task. High levels of self-efficacy indicate confidence to complete the task, while low levels of self-efficacy indicate lower levels of confidence. An individual’s self-efficacy can be influenced by three factors: mastery experiences, vicarious experiences, and social persuasion. According to Bandura, all three factors can help build self-efficacy, however, mastery experiences have been noted as the strongest predictors of self-efficacy. Mastery experiences are those experiences where an individual has previously been successful at a task. Vicarious experiences are those where an individual has been able to witness a peer have success with a certain task, and lastly, social persuasion is where an individual has been given messages of encouragement by someone regarding their ability to complete the task. This study focused on teachers’ previous ELL training as an opportunity for self-efficacy to be built and self-efficacy was approximated as teachers’ perceived competence for each skill.

The three previously described dimensions influencing the preparation of effective ELL teachers were applied to this study by describing SBAE teachers’ training and perceptions of importance and competence within each dimension. For the first dimension, participants indicated training received related to specific ELL teaching skills. Dimensions two and three were described by

asking teachers about their perceptions of the importance and competence in performing skills for working with ELL students. Based on responses received for each dimension, needs will be assessed to plan for future preservice teacher training and providing professional development for practicing teachers, thereby helping to prepare effective SBAE teachers of ELL students.

Purpose and Objectives

The purpose of this study was to describe current SBAE teacher perceptions of and needs related to strategies for working with English language learners in the agriculture classroom. The objectives that guided our study were:

1. Determine SBAE teacher training status related to working with ELL students.
2. Describe SBAE teachers' perceived importance of and competence in strategies for working with ELL students.
3. Determine SBAE teachers' professional development needs for working with ELLs.

Methods

We used a descriptive, survey design to achieve the purpose and objectives of this study. This type of study was chosen because it can be used to summarize characteristics of individuals or groups (Fraenkel et al., 2023). The population of interest for this study was SBAE teachers in Texas. All SBAE teachers who were members of the state agriculture teachers' association ($N = 2,172$) served as the accessible population for sampling purposes. According to Krejcie and Morgan (1970), a sample of 327 teachers was needed to describe the population. Based on response rates from previous survey studies published using this same population, we anticipated a low response rate (20%) with this population. In an attempt to overcome this limitation, oversampling was used (Doss et al., 2022). Based on the estimated response rate of 20%, we determined a sample of 1,635 teachers should be contacted to reach the needed sample size of 327 teachers. Simple random sampling was used to select participants ($n = 1,635$) to create an email contact list using the state agriculture teachers' association directory.

This study utilized a researcher created instrument, which consisted of 41 items relating to teachers' strategies for working with and knowledge of ELL students. Individual items were crafted based on our review of literature. To establish content validity, two members of the research team independently reviewed the list of identified items and collapsed similar items into single items. After this step, the research team discussed any discrepancies and solidified a final list of items. The first section of the instrument asked participants to indicate *yes* or *no* on whether they had received training on specific strategies related to working with ELLs, which aligned with the first dimension of Coady et al.'s (2011) model. The second section of the instrument was a modified version of the Borich Needs Assessment Model (Borich, 1980). Participants were asked to rate their perceived level of importance for each of the 41 strategies for working with ELLs on a five-point Likert-type scale (1 = *Not Important* to 5 = *Very Important*) as well as their perceived competence (1 = *Not Competent* to 5 = *Very Competent*).

This second section of the instrument aligned with dimensions two and three of Coady et al.'s (2011) model. The final section of the instrument consisted of 12 demographic questions used to describe the sample and their current practices related to teaching and working with ELL students.

After Institutional Review Board (IRB) approval was received from Texas A&M University-Commerce, a pilot test was conducted with preservice SBAE teachers enrolled in junior and senior level agricultural education courses ($n = 13$). Since our research objectives would require reporting on individual items, a test-retest coefficient of stability was the appropriate measure of reliability for this study (Warmbrod, 2014). Students in the pilot test completed an initial questionnaire and two weeks later completed the retest questionnaire. Seven useable responses were received for both administrations and a stability coefficient of $r = .81$ was calculated.

Following the pilot test, selected teachers were sent an email invitation to participate with a link to an online Qualtrics questionnaire. Four subsequent reminder emails were sent according to conventions set by Dillman et al. (2014); a total of 117 usable responses was received for a 7.16% final response rate. Since our goal of 327 responses was not met, readers should not generalize results beyond those who responded in this study. Nonetheless, "Studies yielding valid results of interest to the profession from a specific groups [sic] of respondents, regardless of their generalizability, can add to the body of knowledge and assist researchers as they design and conduct research" (Johnson & Shoulders, 2017, pp. 310-311), thus, this study serves as a good baseline for researchers interested in exploring this topic. We also did not control for nonresponse error, since results will not be generalized beyond study participants.

All data from completed responses were exported into a Microsoft Excel spreadsheet where descriptive statistics were calculated for demographic items and objectives one and two. Objective three required the calculation of mean weighted discrepancy scores (MWDS) for each item. According to Borich (1980, p. 39) "The process of identifying training needs can be conceptualized as a discrepancy analysis that identifies the two polar positions of *what is* and *what should be*." In the case of our study the *what is* was perceived competence and the *what should be* was perceived importance. Based on this data, discrepancy scores (DS) were calculated for each item and each participant by subtracting perceived competence from perceived importance. Weighted discrepancy scores (WDS) were then calculated by multiplying DS for each item and participant by the average perceived importance for all participants combined. Finally, a MWDS was calculated for each item by summing weighted discrepancy scores for all participants and dividing by the number of observations. MWDS were then ranked where greatest positive value had the highest priority need for professional development (Borich, 1980). All nonresponse items from incomplete questionnaires were excluded from calculations where appropriate, resulting in inconsistent sample sizes for each item.

Findings

Of the 83 participants who responded to demographic questions, 63.86% were female. A majority of participants identified as White/Caucasian (90.36%), while 6.02% were Hispanic/Latino, 1.2% were Black/African American, 1.2% were Native American, and 1.2%

reported Multi/Biracial. Teachers were mostly traditionally certified (78.31%), while 21.69% reported gaining certification through alternative means. A majority of respondents described their school location as rural (56.63%), while 32.53% reported suburban and 10.84% reported urban. Teachers had an average of 13.30 ($SD = 10.62$) years of teaching experience.

Most (95.18%) teachers were fluent only in English, however 4.82% of respondents reported also being fluent in Spanish. When describing their students, participants reported an average of 16.58% of the students in their courses were ELLs. Teachers could select all that applied for languages spoken by ELLs. Spanish ($f = 79$) was reported most frequently followed by Vietnamese ($f = 6$), Korean ($f = 5$), German ($f = 5$), Portuguese ($f = 2$), Chinese ($f = 2$), Arabic ($f = 2$), French ($f = 1$), and Italian ($f = 1$). When participants were asked if they were required by their school to do anything extra for ELL students such as modifying lesson plans, creating language objectives, and providing supports, a majority said ‘yes’ (53.57%). A majority (78.31%) also indicated they would be interested in attending professional development related to working with English language learners in the SBAE program.

The first objective of this study was to determine SBAE teacher training status related to working with ELL students. Teachers most frequently (75.21%) reported receiving training for general teaching strategies for ELLs. The next most frequently reported item was modifying lesson plans to meet individual ELLs’ needs (56.41%). Teachers reported receiving training on using translation software (13.68%) and on changing ELL parents’ negative perceptions of agricultural education (12.96%) least frequently. Refer to Table 1 for a complete breakdown of training received on strategies for working with ELLs.

Table 1

Frequency of Training Received by SBAE Teachers Related to Working with ELLs

ELL Teaching/Learning Strategy	<i>n</i>	<i>f</i>	%
General teaching strategies for ELLs	117	88	75.21
Modifying lesson plans to meet individual needs	117	66	56.41
Engaging ELL students in the classroom	116	64	55.17
Developing relationships with ELL students	108	57	52.78
Providing language centric experiences for students	117	57	48.72
Encouraging social participation of ELLs with others	108	50	46.30
Creating culturally aware and inclusive lessons	117	53	45.30
Providing opportunities for written language practices	117	53	45.30
Implementing cooperative learning between ELLs and others	117	50	42.74
Communicating with ELL students	108	46	42.59
Emphasizing academic vocabulary development	116	48	41.38
Providing opportunities for oral language practice	117	48	41.03
Developing relationships with bi/multi-lingual colleagues	108	44	40.74
Managing seating proximity to the teacher	108	41	37.96
Developing materials to aid comprehension	116	42	36.21
Finding tools to teach and assess ELLs	116	42	36.21
Teaching to a wide range of English language proficiency	117	40	34.19

Teaching to a wide range of academic levels of ELLs	117	40	34.19
Getting to know student cultural background	108	36	33.33
Scaffolding English language learning	116	38	32.76
Activating and strengthening background knowledge	117	36	30.77
Recruiting students who speak a non-English language	108	32	29.63
Understanding student speech and writing	107	31	28.97
Infusing students' culture in the classroom	108	31	28.70
Determining language spoken in the home	108	31	28.70
Communicating with parents of ELL students	108	30	27.78
Determining English proficiency levels	108	30	27.78
Assessing language and literacy development	117	31	26.50
Identifying language demands of your course content	117	30	25.64
Planning language objectives for all lessons	117	30	25.64
Providing feedback on language use in class	117	29	24.79
Determining literacy level	108	25	23.15
Getting to know first language spoken by ELLs	107	23	21.50
Identifying cultural identities to facilitate learning	117	25	21.37
Managing social perceptions and patterns in the classroom	106	22	20.75
Accelerating literacy development	117	23	19.66
Setting aside time to teach ELLs content and EL development	116	19	16.38
Identifying linguistic identities to facilitate learning	117	19	16.24
Speaking the language of ELLs	117	18	15.38
Using translation software	117	16	13.68
Changing ELLs' parents' negative perceptions of AGED	108	14	12.96

The second objective was to describe SBAE teachers' perceived importance of and competence in strategies for working with ELL students. Strategies of greatest importance to SBAE teachers included developing relationships with ELL students ($M = 4.67$) and communicating with ELL students ($M = 4.67$). Setting aside time to teach ELL students content and EL development ($M = 3.91$) and speaking the language of ELLs ($M = 3.52$) were perceived as least important, although these items were still considered *somewhat important* to *important*.

When describing teacher competence in strategies for working with ELLs, teachers were most competent in developing relationships with ELL students ($M = 3.60$) and in encouraging social participation of ELLs with others ($M = 3.51$). Teachers perceived they were least competent in setting aside time to teach ELLs content and EL development ($M = 2.25$) and in speaking the language of ELLs ($M = 1.94$). Means for perceived importance and competence in using each of the strategies for working with ELLs are presented in Table 2.

Table 2
SBAE Teachers' Perceived Importance of Using Teaching and Learning Strategies with ELLs

ELL Teaching/Learning Strategy	Importance		Competence	
	<i>n</i>	<i>M</i>	<i>n</i>	<i>M</i>
Developing relationships with ELL students	79	4.67	75	3.60
Communicating with ELL students	79	4.67	74	2.96

Engaging ELL students in the classroom	88	4.53	85	3.00
Encouraging social participation of ELLs with others	79	4.52	75	3.51
Developing relationships with bi/multi-lingual colleagues	78	4.46	75	3.45
Communicating with parents of ELL students	79	4.42	75	2.53
General teaching strategies for ELLs	88	4.41	85	2.81
Changing ELLs' parents' negative perceptions of AGED	79	4.41	75	2.76
Providing opportunities for written language practice	88	4.38	85	2.79
Emphasizing academic vocabulary development	87	4.33	84	2.62
Providing opportunities for oral language practice	88	4.30	85	2.76
Finding tools to teach and assess ELLs	88	4.30	84	2.48
Determining English proficiency levels	79	4.29	74	2.69
Accelerating literacy development	88	4.25	85	2.38
Understanding student speech and writing	79	4.25	75	2.57
Determining language spoken in the home	79	4.25	74	2.97
Providing language centric experiences for students	89	4.24	86	2.92
Implementing cooperative learning between ELLs and others	88	4.24	85	2.94
Identifying language demands of your course content	88	4.24	85	2.74
Developing materials to aid comprehension	88	4.22	86	2.44
Activating and strengthening background knowledge	88	4.22	84	2.64
Getting to know student cultural background	79	4.22	75	3.19
Providing feedback on language use in class	88	4.16	85	2.59
Managing social perceptions and patterns in the classroom	79	4.16	75	2.73
Teaching to a wide range of academic levels of ELLs	88	4.14	85	2.54
Scaffolding English language learning	88	4.14	85	2.39
Determining literacy level	79	4.13	74	2.39
Modifying lesson plans to meet individual needs	89	4.12	86	2.52
Identifying linguistic identities to facilitate learning	87	4.09	84	2.33
Teaching to a wide range of English language proficiency	88	4.08	85	2.42
Planning language objectives for all lessons	88	4.07	85	2.46
Using translation software	88	4.06	85	2.59
Assessing language and literacy development	88	4.06	85	2.26
Identifying cultural identities to facilitate learning	88	4.06	85	2.48
Managing seating proximity to the teacher	79	4.06	75	3.28
Getting to know first language spoken by ELLs	79	4.04	75	2.56
Recruiting students who speak a non-English language	79	4.00	75	3.00
Infusing students' culture in the classroom	79	3.99	75	2.77
Creating culturally aware and inclusive lessons	89	3.94	85	2.55
Setting aside time to teach ELLs content and EL development	88	3.91	85	2.25
Speaking the language of ELLs	89	3.52	86	1.94

Note. Importance Scale: 1 = *Not Important*, 2 = *Of Little Importance*, 3 = *Somewhat Important*, 4 = *Important*, 5 = *Very Important*; Competence Scale: 1 = *Not Competent*, 2 = *Little Competence*, 3 = *Somewhat Competent*, 4 = *Competent*, 5 = *Very Competent*.

The final objective of this study was to determine SBAE teachers' professional development needs for working with ELLs. Items with higher MWDS equated with higher need for professional development. The strategies with the highest MWDS were communicating with

parents of ELL students and communicating with ELL students. The lowest needs were in recruiting students who speak a language other than English and managing seating proximity of ELLs to the teacher. Table 3 provides a complete list of professional development needs ranked by MWDS.

Table 3

Ranked Professional Development Needs for Using Strategies for Working with ELLs

ELL Teaching/Learning Strategy	<i>n</i>	<i>MWDS</i>
Communicating with parents of ELL students	75	8.19
Communicating with ELL students	74	7.95
Accelerating literacy development	85	7.90
Finding tools to teach and assess ELLs	84	7.73
Emphasizing academic vocabulary development	84	7.37
Developing materials to aid comprehension	85	7.35
Assessing language and literacy development	85	7.21
Scaffolding English language learning	85	7.16
Changing ELLs' parents' negative perceptions of AGED	75	7.11
Identifying linguistic identities to facilitate learning	83	7.10
General teaching strategies for ELLs	84	6.98
Determining literacy level	74	6.98
Understanding student speech and writing	75	6.97
Engaging ELL students in the classroom	85	6.93
Providing opportunities for written language practice	85	6.90
Determining English proficiency levels	74	6.78
Teaching to a wide range of English language proficiency	85	6.67
Providing opportunities for oral language practice	85	6.53
Teaching to a wide range of academic levels of ELLs	85	6.53
Activating and strengthening background knowledge	84	6.53
Modifying lesson plans to meet individual needs	86	6.52
Planning language objectives for all lessons	85	6.46
Providing feedback on language use in class	85	6.46
Setting aside time to teach ELLs content and EL development	85	6.35
Identifying cultural identities to facilitate learning	85	6.30
Identifying language demands of your course content	85	6.29
Using translation software	85	5.88
Managing social perceptions and patterns in the classroom	75	5.77
Getting to know first language spoken by ELLs	75	5.76
Speaking the language of ELLs	86	5.48
Providing language centric experiences for students	86	5.47
Implementing cooperative learning between ELLs and others	85	5.44
Creating culturally aware and inclusive lessons	85	5.33
Determining language spoken in the home	74	5.28
Developing relationships with ELL students	75	4.92
Infusing students' culture in the classroom	75	4.63
Encouraging social participation of ELLs with others	75	4.46
Developing relationships with bi/multi-lingual colleagues	74	4.46

Getting to know student cultural background	75	4.16
Recruiting students who speak a non-English language	75	3.89
Managing seating proximity to the teacher	75	2.98

Conclusions, Implications, and Recommendations

Several conclusions can be drawn from the results of this study; however, the limitations must first be recognized. The low response rate resulting in a small sample size is not representative of the Texas teacher population, therefore the results of this study are not generalizable to the larger population. The results, conclusions, and recommendations should be approached with caution. The majority of respondents in this study were White, English-speaking females who taught in rural school districts. Just over 15% of respondents' students were considered ELLs who spoke a variety of languages, however, most ELL students were Spanish speakers. Over half of the respondents reported they were required to modify lesson plans for ELL students, and almost two-thirds indicated they would like to have more professional development related to working with ELL students (Vommi & LaVergne, 2016).

Results of this study were consistent with previous research that reported SBAE teachers had received little training in working with ELL students (Vommi & LaVergne, 2016). Responses showed less than half of participants received training in 37 of the 41 teaching and learning strategies. All teaching and learning strategies listed in this study are needed by effective teachers of ELL students (Coady et al., 2011), so based on the results, most teachers in this study lacked the background, preparation, and experience to be considered effective according to Coady et al.'s (2011) model. Also, out of the top 20 teaching and learning strategies in which teachers received training, only four pertained to teachers' knowledge of ELL students as learners, the remainder related to teaching and learning processes (Coady et al., 2011). Considering Coady et al.'s (2011) model, the participants' training was imbalanced, and they should receive more training in the relational aspects of knowing ELL students as learners. Salem (2021) concurred that SBAE teachers should receive more training in relationship development; however, the results of this study would suggest otherwise. Participants agreed the most important skill was developing relationships with ELL learners, but this was the skill with which they felt most competent. This either suggests that teachers have been able to navigate relationship building via their classroom experiences with students (Khong & Saito, 2014), or they are unaware of the knowledge they lack regarding building relationships with ELL students.

When examining teachers' competence for working with ELL students, there were no teaching and learning strategies where teachers felt more than *somewhat competent*. Participants' low levels of perceived competence could most likely be related to their reported lack of training (Bandura, 1986). The top two MWDS revealed that communication was the most needed area of professional development, which is congruent with previous literature (Gándara et al., 2005; Hansen-Thomas et al., 2014; Khong & Saito, 2014; Salem, 2021). Less than half of teachers received training in either of the skills related to communicating with ELL students or their families, which could explain the decreased levels of perceived competence (Bandura, 1986). Of

the top teaching and learning strategies needed for professional development, only two were characteristics of high-quality teachers of ELL students: developing materials to aid in ELL students' comprehension (Brower & Korthagen, 2005; Menken & Antuñez, 2001) and assessing language and literacy development (Abedi et al., 2004; Brower & Korthagen, 2005).

Several recommendations can be made based on the results of this study. First, professional development providers should consider furnishing training to increase teachers' knowledge of the teaching and learning processes associated with ELL students, as well as their knowledge of ELLs as learners. Additionally, professional development should be provided to help improve teachers' communication with ELL students and their parents, as results from this and multiple studies have shown this is the area of most concern for teachers (Gándara et al., 2005; Hansen-Thomas et al., 2014; Khong & Saito, 2014; Salem, 2021). Similarly, teacher preparation programs should provide experiences to allow preservice teachers to work with ELL students. Coady et al. (2011) reported that preservice teachers felt this was the most helpful component of their teacher preparation program in preparing them to work with ELL students. Teacher preparation programs should also actively recruit preservice SBAE teachers from common ELL student groups. Further, research should examine what education preparation programs are currently doing to help prepare students for working with ELL students and determine the most effective ways of training high-quality SBAE teachers of ELLs. Identifying barriers related to working with ELLs in the other sectors of agricultural education such as FFA and SAE would also be beneficial. Qualitative research where SBAE teachers who are known to effectively teach and work well with ELL students should be conducted to identify strategies where other SBAE teachers may be able to improve their skills in working with these populations.

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Educational Outcomes, Life Skill Development, and Intrinsic and Extrinsic Returns of Texas 4-H and FFA Livestock Show Projects: Perceptions of County Extension Agents, Agricultural Science Teachers, and Livestock Exhibitor Families

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Abstract

Texas enjoys the largest youth livestock program in the nation with the most projects, exhibitors, and support—from both monetary and programmatic standpoints. The purpose of this study was to measure and explain the scope, relevance, and outcome of Texas 4-H and FFA youth livestock show programs. We employed three different survey instruments to examine and compare perceptions of County Extension Agents (CEAs), Agricultural Science Teachers (ASTs), and Livestock Exhibitor Families (LEFs) regarding important elements of youth livestock show programs. We sought to understand perceived educational outcomes, perceived life skill development, and perceived return-on-investment. Texas CEAs, ASTs, and LEFs indicated livestock show projects foster an environment for developing life skills (responsibility, sportsmanship, work ethic, respect, ethical decision making) and for increasing knowledge of food animal agriculture (animal science, the food supply, safe animal handling and welfare, and producing a safe food animal product). All three respondent groups agreed participation in the livestock project is worth the investment when intrinsic and extrinsic returns were considered.

Introduction

Since its beginnings in 1914 through the Smith-Lever Act, the Cooperative Extension Service (Extension) has grown and is now the largest adult and youth education organization in the United States. Extension provides youth development mainly via 4-H. Similarly, federal support for vocational education began with passage of the Smith-Hughes Act in 1917. Designed primarily for education of youth, vocational agricultural education discovered that farm youth needed more than knowledge of growing plants and animals—but also knowledge leading to life skills. The Future Farmers of America (now, FFA) was established in 1928 to promote those skills. Both 4-H and FFA are rich in their traditions of teaching life skills to youth throughout the United States. Despite losses in the agrarian population, the need for youth to learn and grow in areas of agricultural leadership, education, and life skills remains. It is imperative that program administrators explain the impact that participation in 4-H and/or FFA has on youth, families, and their communities (Boleman et al., 2003; Boleman et al., 2005).

Cummings et al. (2019) explained that there is immense value in interpreting evaluation results and telling a compelling story to stakeholders. Interpretation to supporters and funders can help increase future support and garner new relationships that are founded on similar goals.

Cummings et al. (2019) also stated effective interpretation is closely linked to evaluation and helps our funding partners assess programming efforts.

In 2009, Lamm and Harder challenged Extension to "prove 4-H's worth by demonstrating clear return-on-investment to stakeholders" (4-H in Modern America section). The 4-H program faces

a more difficult challenge in demonstrating return-on-investment, or economic impact, than most Extension programs because the impact of teaching life skills to youth is less readily quantifiable than impacts from other program areas. Some components of 4-H lend themselves to measuring economic impact. The 4-H livestock program is one of those components (Harder & Hodges, 2011).

Texas accommodates the largest FFA memberships and the most extensive 4-H programs. Texas' local schools provided formal education in agriculture to their 115,000 FFA members; this number was 32,000 more than California's second largest FFA membership in 2021 (Hadachek, 2021). Nationwide, cooperative extension services of land-grant institutions develop 4-H programs for youth to become accountable citizens and community change leaders (National Institute of Food and Agriculture, n.d.). In Texas, Texas A&M AgriLife Extension Service in the Texas A&M University System serves more than 550,000 5- to 18-year-old youth in various 4-H programs annually (Texas 4-H, n.d.-a). Together, FFA and 4-H programs continue to be extensive and diverse (Boleman, 2003; Boleman et al., 2005; Ganzel, n.d.).

Texas has more 4-H and FFA livestock projects than any other state (Texas A&M AgriLife, n.d.). Each livestock project steadfastly aims for youth development through formative learning experiences that enhance knowledge of animal husbandry and health and additional life skills (National Institute of Food and Agriculture, n.d.; Texas Youth Livestock & Agriculture, n.d.). Robust, yet consistent, evidence confirms an increase in self-confidence and interpersonal skills among youth livestock exhibitors in school, at home, and on the job. Over time, youth livestock shows can help develop more dependable, confident, and qualified individual exhibitors (Rusk et al., 2003). The needs of our society for prepared and competent young people call for Texas Youth Livestock & Agriculture (TYLA) to commit to learning and hands-on experience (Zanolini et al., 2013). Each year in Texas, livestock exhibitions, auctions, and sales generate more than \$108 million (Cook, 2015). Local businesses, stakeholders, supporters of the program, and the state's general population pay close attention to the success or failure of livestock shows. Success leads to support by federal, state, and local governments and by private funders (Hachfeld et al., 2013). Ultimate success is developing more competent youth and young citizens because of their participation in high-quality agricultural science education and Extension programs (Smith et al., 2009).

Youth are influenced by their environment. The opportunity for developmental activities gives them a way to be successful by allowing them to positively contribute to their families, out-of-school activities, neighborhoods, and communities (Lerner, 2008). Lerner (2008) suggested the Five C's as a path to positive youth development: competence, confidence, connection, character, and caring. These attributes can lead to the development of the sixth C, which is contribution (Lerner, 2008).

Lerner (2008) also identified three ways to promote the Five C's of positive youth development in adolescents. Youth should be given the opportunity to have consistent and positive interactions with adults, to be involved in structured activities that nurture the development of life skills, and to obtain leadership roles in their communities. Ultimately, these opportunities help foster a sense of stewardship and volunteerism that can lead to contributions by these young people in the future (Lerner, 2008).

This type of experiential learning described by Lerner is a fundamental aspect of youth development, especially as implemented through 4-H and FFA. Experiential learning has been a vital component of agricultural education since the inception of vocational agriculture (Hanagriff et al., 2009). Students were required to have a supervised farm project to gain hands-on experience. Curtis and Mahon (2010) wrote that experiential learning encourages students to apply concepts to actual problems in the area, thus increasing soft skills and value to future employers. These types of experiences are now referred to as Supervised Agricultural Experiences (SAE) in agricultural education. According to Hanagriff et al. (2009), SAEs can be any type of agricultural-related project that focuses on entrepreneurship. Livestock projects are one example of an SAE.

Rusk et al. (2003) found that skills young people learn through livestock projects benefit them in school, at home, and on the job. Youth livestock exhibitors emerge as more dependable, confident, and qualified individuals through participating in this project area (Rusk et al., 2003). They also discovered that raising animal projects helped youth increase self-confidence and improve interpersonal skills. Participation in livestock judging and/or showmanship classes may also lead to an improvement in both people skills and public speaking ability (Rusk et al., 2003). The authors suggested the improved problem-solving, decision-making skills, and enhanced people skills these young people learn, “make [them] valuable citizens at work and in their communities” (Rusk et al., 2003, p. 10).

The recent COVID-19 epidemic disrupted livestock shows and projects, curtailing some youth, family, and community participation (Texas 4-H, 2020). The disruption allowed us to ask about the worthiness and value of livestock shows/exhibition by youth. We sought to measure and understand perceived educational outcomes, perceived life skill development, and perceived return-on-investment.

Objectives

1. Describe the size and scope of Texas 4-H and FFA livestock show projects.
2. Evaluate and compare perceptions of County Extension Agents, Agricultural Science Teachers, and livestock exhibitor families regarding educational outcomes and life skill development of 4-H and FFA livestock projects raised for exhibition.
3. Evaluate and compare perceptions of County Extension Agents, Agricultural Science Teachers, and livestock exhibitor families regarding return-on-investment and alignment of project inputs with intrinsic and extrinsic rewards.
4. Were the investments “worth it” in terms of costs versus benefits (ROI)?

Methods

Population and Sample

Our target population comprised three groups; individuals from these three groups are integral and indispensable to Texas 4-H and FFA youth livestock programs. Each of the groups was defined constitutively as follows:

- County Extension Agent (CEA): An educator employed by Texas A&M AgriLife Extension Service and who works in Texas counties to deliver research-based educational information to youth and adults. CEAs also oversee county 4-H programs.
- Agricultural Science Teacher (AST): An educator employed by a local school district to deliver agricultural-based education to youth in formal classes, generally at the secondary level. ASTs also serve as advisors to local FFA chapters.
- Livestock Exhibitor Family (LEF): A family who purchases, raises, trains, and feeds livestock for local, county, regional, or statewide shows and competitions.

The sample frame of CEAs comprised 250 agents in Texas who had responsibilities in agriculture and 4-H/youth livestock projects. The list of 250 agents was provided by Texas A&M AgriLife Extension Service. The sample frame of agricultural science teachers (ASTs) was 2,621 teachers identified as teaching one or more classes of food, agriculture, and natural resources in Texas. The sample frame of livestock exhibitor families (LEFs) was a list of livestock exhibitor families whose children exhibit county or state-validated livestock projects. This audience was reached via county livestock validation lists, state livestock validation lists, major livestock show entry systems, and the Quality Counts program contact list. These lists included exhibitors who showed at county and state levels. The Quality Counts program is required of all exhibitors who show at Texas major livestock shows and includes some county-level participants.

The Institutional Review Board of Texas A&M University approved this human-subject research (approval protocol code IRB2020-0230M). Survey participation was voluntary. Participants electronically consented before completing the survey; they did not enter names or any other identifying information (Frankel & Wallen, 2009). We recognize the following as possible limitations to response numbers: The COVID-19 pandemic may have limited participation in the 2019-2020 livestock exhibition season. Exhibitors were not able to compete at either the Houston Livestock Show and Rodeo or Rodeo Austin, two of Texas' largest major livestock shows. Additionally, many county-level livestock shows across the state were canceled due to COVID-19. Other external impediments to the completion of the questionnaires were poor or absent internet connections in rural areas and lack of financial incentives.

Data Collection Instrument and Data Collection

Survey questions were in Likert scales, multiple-choice questions, and numerical fill-in answers. We operationalized intrinsic and extrinsic returns as life skill development and educational outcomes (intrinsic) and return-on-investment (ROI) (extrinsic). Responsibility, sportsmanship, respect, and ethical decision-making were life skills that might be developed; similarly, animal science, food supply, safe animal handling and welfare, and producing safe food animal products were knowledge areas as educational outcomes (Texas 4-H, n.d.-b). ROI was operationalized by perceptions of family time spent preparing for exhibitions, monetary returns, scholarships, value of professional connections, and value to career preparation.

Totals of 234/250 (90%) CEAs, 309/2,621 (12%) ASTs, and 6,984 LEFs responded to three respective surveys. We could not calculate response rate of LEFs, as email lists may have contained duplicate contacts per family. These response groups were identified from their affiliated email listservs, databases, entries, or mailing lists, completed online Qualtrics© surveys

through one of the four rounds in April and May 2020. Our response rates were achieved through multiple modes of recruitment via email and social media posts to the various groups. The AST group had a lower response rate because not all Agricultural Science Teachers oversee livestock projects. Rather, they may supervise other experiences such as horticulture/floriculture projects, agricultural mechanics projects, or crop projects. Based on social exchange theory, survey respondents expect their responses to benefit the livestock program (Dillman et al., 2014). Eliciting information from respondents whose benefits, trust, and sense of identity outweigh their time of survey completion determines the quality of assessment (Dillman et al., 2014; Roloff, 1981). Our statement preceding the survey read:

You will receive no direct benefit from participating in this study; however, data garnered from this study will provide useful information that will be used to improve Texas 4-H and FFA Livestock Projects for the benefit of future participants and ultimately gain further support of the program.

Responses from the 7,527 survey participants were the basis for our descriptive, comparative, and qualitative evaluation. Our interpretation of numbers entails a story to various stakeholders to ground reasoning, share the results, and get further support (Cummings et al., 2019). We also collected and sorted comments to compare to/elucidate quantitative results.

Findings

To describe the current size and scope of Texas 4-H and FFA livestock show projects, we asked LEFs how many of each species they exhibited. The results are shown in Table 1. This is descriptive information only and does not capture the totality as we do not know how many total exhibitors and exhibitor families there were.

Table 1

Species Exhibited During 2019–2020 Livestock Show Season (N = 6,984 LEFs)

Species	<i>f</i>	%
Market Barrows	1,853	16.22
Breeding Heifers	1,590	13.92
Steers	1,567	13.72
Market Lambs	1,400	12.26
Market Goats	1,392	12.19
Breeding Gilts	1,227	10.74
Rabbits	808	7.07
Broilers/Chickens	529	4.63
Breeding Sheep	252	2.21
Wether Does (Goats)	224	1.96
Breeding Does	223	1.95
Wether Dams (Sheep)	184	1.61
Turkeys	174	1.52
Total	11,423	100.00

Note. Total number was > number of respondents because respondents could select > one species.

Also, livestock exhibitors had the opportunity to exhibit their projects at a range of competition levels. These shows vary from local or county shows to jackpot shows that are invitational to major livestock shows that offer statewide exhibition/competition (see Table 2).

Table 2
Level of Participation (N = 6,984 LEFs)

Type of Livestock Show	<i>f</i>	<i>%</i>
County Livestock Show	5,196	29.97
Major Livestock Shows	4,644	26.78
Local Livestock Shows	3,894	22.46
Jackpot Shows	3,606	20.80
Total	17,340	100.00

Note: Total exceeds the number of respondents as exhibitors could enter more than one show.

Objective 1 helped set the stage for the study by providing a baseline understanding of the size and scope of Texas livestock show projects.

The second objective was to examine perceptions of CEAs, ASTs, and LEFs regarding educational and life skill development outcomes of those youth who exhibit in Texas 4-H and FFA livestock shows. Responses from participants were to a stem question that asked, “For youth who participate, does livestock exhibition ... [*insert outcome*]? Possible responses were as follows: *Definitely* – 3, *Somewhat* – 2, *Does Not* – 1. We described mean values from this scale as: 2.50–3.0 – *Definitely*; 1.50–2.49 – *Somewhat*; and 1–1.49 – *Does Not*.

Table 3
Perceptions of CEAs, ASTs, and LEFs Regarding Life Skill Development and Educational Outcomes (N = 7,527)

Does Livestock Exhibition...?	CEA			AST			Families		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Increase Responsibility	219	2.85	0.36	248	2.85	0.37	4,654	2.95	0.25
Increase Sportsmanship	219	2.62	0.51	248	2.55	0.55	4,653	2.83	0.41
Increase Work Ethic	218	2.81	0.43	246	2.78	0.42	4,653	2.93	0.26
Increase Respect	219	2.68	0.50	247	2.60	0.55	4,643	2.86	0.38
Increase Ethical Decision Making	219	2.51	0.59	248	2.46	0.60	4,652	2.79	0.48
Increase Animal Science Knowledge	219	2.68	0.50	247	2.80	0.42	4,650	2.90	0.32
Increase Knowledge About the Food Supply	219	2.45	0.59	248	2.57	0.61	4,653	2.77	0.46
Increase Knowledge of Safe Animal Handling and Welfare	219	2.60	0.55	248	2.70	0.49	4,652	2.90	0.32

Increase Knowledge of Producing a Safe Food Animal Product	219	2.48	0.62	247	2.56	0.57	4,645	2.79	0.45
Perceived Development Total	219	2.63	0.39	248	2.65	0.37	4,659	2.86	0.25

Note. Definitely does – 3, Somewhat does – 2, Does Not – 1

All respondent groups indicated that livestock show projects either *somewhat* (3 means) or *definitely* (24 means) did foster an environment for increasing educational outcomes and life skill development in the areas of responsibility, sportsmanship, work ethic, respect, ethical decision making, animal science knowledge, knowledge about the food supply, safe animal handling and welfare knowledge, and knowledge about producing a safe food animal product. A combined construct variable was calculated averaging results of all nine variables. We called this variable Total Perceived Development. All three group means for the composite/total were in the “definitely” category.

To further tease out responses, we contrasted professional educators (CEAs and ASTs) to LEFs (see Table 4). The results indicated means were statistically significantly different in all nine traits, with the total/composite yielding the largest difference ($t = 16.75, p < 0.001, d = 0.81$) A Cohen’s d effect size ($d = 0.81$) suggests a large practical significance, with LEFs having a higher positive mean.

Table 4

Orthogonal Contrasts Comparing Professional Educators (CEA/AST) to LEFs Regarding Life Skill Development and Educational Outcomes (N = 7,527)

Perceptions	Value of Contrast	Std. Error	t	p	Cohen’s d
Increase Responsibility	0.10	0.01	8.84	<0.01	0.43
Increase Sportsmanship	0.25	0.02	12.06	<0.01	0.59
Increase Work Ethic	0.13	0.01	9.83	<0.01	0.48
Increase Respect	0.22	0.02	11.34	<0.01	0.55
Increase Ethical Decision Making	0.30	0.02	13.36	<0.01	0.65
Increase Animal Science Knowledge	0.16	0.02	9.75	<0.01	0.47
Increase Knowledge About the Food Supply	0.26	0.02	11.10	<0.01	0.54
Increase Knowledge of Safe Animal Handling and Welfare	0.25	0.02	15.33	<0.01	0.75
Increase Knowledge of Producing a Safe Food Animal Product	0.26	0.02	11.61	<0.01	0.57
Perceived Development Total	0.22	0.01	16.75	<0.01	0.81

The second orthogonal contrast compared CEA respondents to AST (see Table 5). We evaluated the nine perceptions and the total construct variable. While there were four statistically significant differences in means, Cohen’s d for each difference in perceptions was negligible.

Table 5

Orthogonal Contrasts Comparing County Extension Agents to Agricultural Science Teachers Regarding Life Skill Development and Educational Outcomes (N = 543)

Perceptions	<i>Value of Contrast</i>	<i>Std. Error</i>	<i>t</i>	<i>p</i>	<i>Cohen's d</i>
Increase Responsibility	0.00	0.02	0.11	0.91	0.01
Increase Sportsmanship	0.07	0.04	1.74	0.08	0.13
Increase Work Ethic	0.03	0.03	1.05	0.30	0.07
Increase Respect	0.09	0.04	2.34	0.02	0.16
Increase Ethical Decision Making	0.05	0.05	1.10	0.27	0.08
Increase Animal Science Knowledge	-0.12	0.03	-3.77	<0.01	-0.26
Increase Knowledge About the Food Supply	-0.12	0.04	-2.63	0.01	-0.19
Increase Knowledge of Safe Animal Handling and Welfare	-0.10	0.03	-3.28	<0.01	-0.20
Increase Knowledge of Producing a Safe Food Animal Product	-0.08	0.04	-1.92	0.06	-0.14
Perceived Development Total	-0.02	0.03	-0.77	0.44	-0.05

The next objective was to evaluate and compare perceptions of CEAs, ASTs, and LEFs related to return-on-investment for youth livestock show projects. Though the intent of raising and exhibiting livestock is typically not focused on economic returns, these data may be useful in telling a story of investment and reward. We described means for the three respondent groups related to their perceptions of “return-on-investment” in terms of nine possible benefits (and a composite/overall/total benefit. The responses for the questions written as “Was [*insert possible benefit*] worth the investment?” were these: *Worth the investment*–3; *Somewhat worth the investment*–2; *Not worth the investment*–1. We described the means of responses as follows: project(s) was/were *definitely worth the investment* in the areas of: family time spent together, educational outcomes, life skill development, professional connections, and career preparation. Respondents indicated that the livestock project was only *somewhat worth the returns-on-investment* in the areas of monetary returns (dollars earned) and potential scholarships received. The lowest mean scores were reported for monetary returns-on-investment in terms of dollars earned. We calculated a combined construct variable to comprise responses to all nine statements. We called this variable ROI Total. County Extension Agents’ mean for total perceived return-on-investment through livestock projects was 2.62 (*SD* = 0.33). Agricultural Science Teachers reported a combined perceived impact total of 2.53 (*SD* = 0.37). The livestock exhibitor family respondents averaged the highest cumulative response for this construct of 2.65 (*SD* = 0.34). The family respondent group was the most closely associated with the expenses of the livestock project but rated the highest perceived outcomes for return-on-investment.

Table 6

Perceptions of County Extension Agent, Agricultural Science Teachers and Livestock Exhibitor Families Regarding Return-On-Investment (N = 7,527)

Perception of ROI	CEA			AST			Families		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Family Time Spent Together	219	2.95	0.21	244	2.85	0.37	4,615	2.87	0.37
Educational Outcomes	219	2.79	0.44	244	2.77	0.48	4,609	2.87	0.36
Life Skill Development	217	2.90	0.30	242	2.86	0.40	4,599	2.95	0.23
Monetary Returns (Dollars Earned)	219	1.79	0.70	244	1.73	0.64	4,608	1.98	0.77
Potential Scholarships Received	218	2.46	0.64	244	2.30	0.65	4,600	2.52	0.66
Professional Connections	219	2.73	0.48	243	2.58	0.56	4,605	2.63	0.60
Career Preparation	219	2.72	0.52	243	2.63	0.54	4,608	2.75	0.50
ROI Total	219	2.62	0.33	244	2.53	0.37	4,617	2.65	0.34

Note. Scale as follows: *Worth the Investment* – 3, *Somewhat Worth the Investment*– 2, *Not Worth the Investment* – 1

We evaluated the previous seven perceptions of ROI components, along with the total construct variable (ROI Total) in Table 7 as orthogonal contrasts comparing professional educators (CEAs and ASTs) to livestock exhibitor families. Six of the variables showed that the two groups were statistically significantly different in their responses related to return-on-investment through livestock projects (educational outcomes, life skill development, monetary returns, potential scholarships received, and career preparation). The two means not statistically significantly different between the groups were for family time spent together and professional connections. And, although the groups were statistically significantly different ($t = 4.70, p < 0.01, d = 0.23$) overall in their perceptions of return-on-investment related to Texas 4-H and FFA livestock projects, this difference was of small practical significance (Cohen’s $d = 0.23$).

Table 7
Orthogonal Contrast Comparing Professional Educators (CEA/AST) to Livestock Exhibitor Families Return-On-Investment Related to Inputs (N = 7,527)

Perception of Benefit to Cost	<i>Value of Contrast</i>	<i>Std. Error</i>	<i>t</i>	<i>p</i>	<i>Cohen’s d</i>
Family Time Spent Together	-0.03	0.02	-1.75	0.08	-0.09
Educational Outcomes	0.09	0.02	5.05	<0.01	0.25
Life Skill Development	0.07	0.01	6.26	<0.01	0.31
Monetary Returns (Dollars Earned)	0.22	0.04	5.95	<0.01	0.29
Potential Scholarships Received	0.14	0.03	4.22	<0.01	0.21
Professional Connections	-0.03	0.03	-0.96	0.34	-0.05

Career Preparation	0.07	0.02	3.01	<0.01	0.15
ROI Total	0.08	0.02	4.70	<0.01	0.23

We computed another set of orthogonal contrasts of the County Extension Agent respondents and the Agricultural Science Teacher respondents on topics regarding return-on-investment in Table 8. Three means (family time spent together, potential received scholarships, and professional connections) showed that the two professional educator groups were statistically significantly different in their responses related to return-on-investment through the livestock project. County Extension Agents reported higher mean scores than Agricultural Science Teachers for all three of these perception variables. We also saw a statistically significant difference between the two groups ($t = 2.78, p < 0.01, d = 0.25$) for the total construct, but, again, a small practical significance using Cohen's d effect size ($d = 0.25$).

Table 8
Orthogonal Contrast Comparing County Extension Agents to Agricultural Science Teachers Regarding Return-On-Investment Related to Inputs (N = 543)

Perception of Benefit to Cost	Value of Contrast	Std. Error	t	p	Cohen's d
Family Time Spent Together	0.10	0.03	2.98	<0.01	0.34
Educational Outcomes	0.01	0.03	0.43	0.66	0.03
Life Skill Development	0.04	0.02	1.74	0.08	0.11
Monetary Returns (Dollars Earned)	0.07	0.07	0.97	0.33	0.10
Potential Scholarships Received	0.16	0.06	2.53	0.01	0.24
Professional Connections	0.15	0.06	2.63	0.01	0.28
Career Preparation	0.08	0.05	1.78	0.07	0.16
ROI Total	0.09	-0.03	2.78	0.01	0.25

Finally, we described the associations between the three respondent groups on their overall opinion of youth participation in livestock show projects. Table 9 shows overall responses to, "Do you believe participation in the livestock project is 'worth it'?" An overwhelming majority of all three respondent groups indicated they do believe participation in the Texas 4-H and FFA livestock project is worth it. In total, 97.90% ($f = 4,956$) reported "yes" when asked their perception of this question. Only 2.10% ($f = 104$) reported that they do not believe participation in this project area is worth it.

Table 9
Chi-Square Analysis of Responses to Question "In Conclusion, Do You Believe Participation in the Livestock Project Is "Worth It"?" As Expressed by CEAs, ASTs, and LEFs (N = 5,060)

Respondent Group	Yes		No		Total	
	f	%	f	%	f	%
County Extension Agent	216	(99.50%)	1	(0.50%)	217	(100.00%)
Agricultural Science Teacher	229	(93.50%)	16	(6.50%)	245	(100.00%)
Livestock Exhibitor Family	4,511	(98.10%)	87	(1.90%)	4,598	(100.00%)
Total	4,956	(97.90%)	104	(2.10%)	5,060	(100.00%)

χ^2 27.72

Contingency Coefficient 0.07 $p < .01$

We asked participants to provide context for their responses. Here are a few excerpts from the 3,090 text responses to highlight the sentiments of respondents on the question, “Do you believe participation in the livestock project is ‘worth it?’” Most responses can be summarized by this quote, “The intrinsic return has always surpassed the financial return.”

“You shouldn't go into this project to ‘make money’.” It takes luck to do that. But, it is an incredible way for students to learn life skills that will benefit them after the projects are done.”

“You simply cannot replace time spent together, meeting new people, learning and making friends, along with the other benefits listed above! We love what we do as a family!”

“You cannot put a price on life lessons. Livestock projects give the family an opportunity to grow. Yes, there are other avenues families can take sports being one. But the beauty of livestock it doesn't matter if you are fast, tall, or strong. Boys and girls get a chance to compete against each other on who works the hardest and smartest.”

“This box isn't big enough for my explanation! As a parent, I did not make my children take part in livestock projects, they chose this, and we support them. We tell them that as long as they keep working hard at it and show that they deserve for us to spend the money on their project, then we will continue to support them. They have definitely held up their end of the deal. Now that they are old enough to drive, set up stalls at a show, pay their own entries, check in at the show, and we get to just watch and be proud. I'd say it's all worth it! At home, they halter break, work on showmanship, work hair, drive hogs, feed correctly, and do their own research for improvements, clean stalls, and keep the barn organized. I'd say it's all worth it!”

Finally, one livestock exhibitor family respondent simply concluded, “It made me a better person; you can't put a dollar sign on that.”

Conclusions and Implications

The size and scope of livestock show projects in Texas is large!

The results may prove beneficial to educators of youth, livestock exhibitor families, livestock show boards and fundraising entities, and other stakeholders of the youth livestock program. The accurate perception of tangible and intangible investments may help new exhibitor families and educators better prepare for subsequent livestock seasons. The time investment made by livestock exhibitors and their families helps communicate the narrative of hard work and dedication cultivated in the youth livestock program. This may translate to a capable and prepared future workforce.

All three respondent groups (County Extension Agents, Agricultural Science Teachers, and Livestock Exhibitor Families) indicated livestock show projects either *somewhat* or *definitely* fostered an environment for life skill development in the areas of responsibility, sportsmanship, work ethic, respect, and ethical decision making, and increasing educational outcomes of animal science knowledge, knowledge about the food supply, safe animal handling and welfare knowledge, and knowledge about producing a safe food animal product. These positive findings for youth development traits and educational outcomes are supported by several previous studies (Boleman et al., 2005; Curtis & Mahon, 2010; Rusk et al., 2003).

Most notably, almost 98 percent of all respondents agreed that participation in the livestock project is worth the investment when all intrinsic and extrinsic costs and returns were considered. This helps us understand that the project area remains a crucial and reliable source of positive youth development. The Texas 4-H and FFA youth livestock show program is an opportunity to gain valuable life skills and knowledge related to raising livestock.

Texas agriculture experienced significant economic loss in the COVID-19 pandemic, just as other states did. Our assessment results during the global pandemic—when livestock exhibitions were curtailed and auctions/sales of livestock and poultry sharply limited—provided strong evidence of the worthiness of the Texas 4-H and FFA youth livestock program in terms of intrinsic returns. This implies a long tradition of youth livestock projects, and the learning opportunities continue, despite economic loss (Martinez et al., 2021).

Livestock exhibitor families reported the most positive perceived outcomes related to life skill development and for educational outcomes. This is relevant because while it may be apparent that the educator groups believe these outcomes are occurring, the livestock exhibitor family group is the most closely associated with the projects and with the young people involved.

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Using Self-Efficacy Theory to Design Arduino Instruction for Novices: A Replication Study

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Abstract

This study replicated previous research by the authors which found that an instructional treatment based on self-efficacy theory increased the interest, self-efficacy, and knowledge of novice Arduino users. Arduino is a line of open-source microcontrollers commonly used in education and industry. In the current study, students (n = 32) in an introductory agricultural systems technology course participated in a lesson on Arduinos, circuit breadboarding, and Arduino programming which included four hands-on practice tasks, designed to provide students with positive mastery, vicarious and social persuasion experiences. Following the lesson, students completed a laboratory activity and were provided additional opportunities for mastery, vicarious, and social persuasion experiences. The one-group pretest-posttest design indicated the instructional treatment had significant ($p < .001$) and large effects in increasing students' interest in Arduino, breadboarding self-efficacy, programming self-efficacy, and Arduino knowledge. These findings were consistent with the original study and provided additional evidence for self-efficacy theory as an effective model for developing instruction for novice Arduino users. This replication extends previous research through open coding analysis of student post-instruction comments. Qualitative results were consistent with the quantitative data and provided additional insight about student perceptions of Arduino and the instructional treatment.

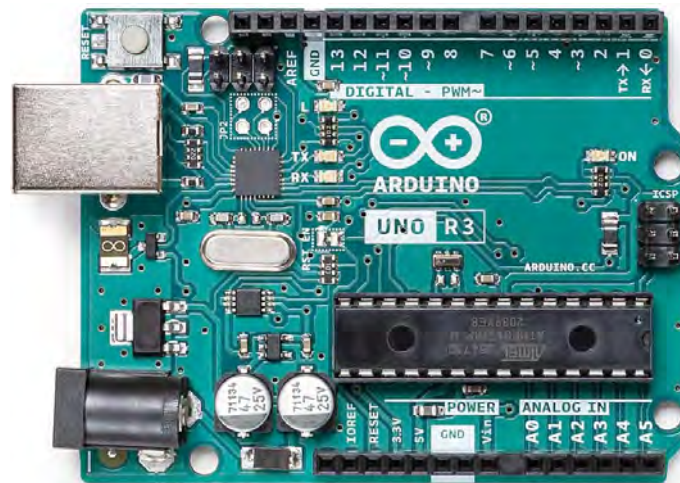
Microcontrollers are integrated circuit devices that contain a microprocessor, peripherals, and inputs and outputs in a small physical package (Keim, 2019). Microcontrollers are at the heart of embedded computing systems widely used in agricultural applications ranging from greenhouses (Liu, 2022) to field robots (Jude et al., 2022). Because microcontrollers are ubiquitous in monitoring and control systems (Darr et al., 2007), agriculture students should develop a basic understanding of microcontrollers as part of their undergraduate education (Hood, 2022). This is supported by Mercier (2015) who encouraged educators to prepare graduates for “related occupations that serve the . . . agricultural and food sciences disciplines” (p.2), and by Stripling and Ricketts (2016) who identified the need to identify methods, models, and programs to support career preparation for a scientific workforce in agriculture.

The Arduino UNO (Figure 1) is a programmable, open-source microcontroller widely used to teach microcontroller principles and programming (Al-Abad, 2017). According to Herger and Bodarky (2015), the Arduino UNO is a complete hardware and software package that can be used to teach both novice and advanced students.

Researchers (DesPortes & DiSalvo, 2019; Sadler et al., 2017) have found that novice students experience difficulties in learning to work with Arduinos. The primary difficulties were related

to breadboarding (constructing temporary) circuits and in programming. Sadler et al. (2017) reported that, after instruction, only 36 of 68 (52.9%) students could successfully complete a simple breadboarding and Arduino programming task. Lane et al. (2002) noted that task failure was associated with decreased task self-efficacy, while Ryan and Deci (2000) found that low self-efficacy in a particular subject was related to decreased student interest in studying the subject. Thus, novice students studying microcontrollers and microcontroller programming, may fail to master these topics, and, consequently, develop low self-efficacy and decreased interest in learning about these topics.

Figure 1
Arduino UNO Microcontroller



Recognizing this potential for student failure and the resultant lack of self-efficacy and decreased interest when studying microcontrollers and programming, Johnson et al. (2022) used self-efficacy theory (Bandura, 1986) to develop an instructional treatment (lesson and laboratory activity) to teach circuit breadboarding and Arduino programming to novice students in introductory agricultural systems technology courses at two universities. The instructional treatment was evaluated on whether it increased students' Arduino interest, breadboarding self-efficacy, Arduino programming self-efficacy, and Arduino knowledge. In the pilot test at University A, the researchers reported significant ($p < .01$) and large (Cohen, 1988) increases in post-treatment measures of breadboarding self-efficacy and Arduino knowledge, but no significant ($p > .05$) increases in Arduino interest or programming self-efficacy. This was consistent with the lower project rubric scores for programming and the substantial (Davis, 1971) correlations ($r = .50$ to $.58$) between breadboarding and programming task performance and breadboarding self-efficacy, programming self-efficacy, and Arduino interest. Based on these results, the researchers revised the instructional treatment by incorporating four hands-on practice tasks into the lesson and re-tested the treatment at University B. The revised instructional treatment resulted in significant ($p < .001$) and large (Cohen, 1988) increases in posttest measures of students' Arduino interest, breadboarding self-efficacy, Arduino programming self-efficacy, and Arduino knowledge.

According to Bettis et al. (2016), replication of previous research is an essential cornerstone for “creating repeatable, cumulative knowledge” (p. 2193) in a discipline. Bettis et al. further stated “if studies of the same population differ in only the data sample but provide different results, the validity of these results may warrant further investigation” (p. 2195). Conversely, if a replication with the same population and a different sample produces the same results, validity for that population is strengthened. Therefore, this study sought to replicate the Johnson et al. (2022) study using a different sample drawn from the same population at University A using the same revised instructional treatment found to be effective at University B.

Theoretical Framework

Johnson et al. (2022) used Bandura’s (1986) self-efficacy theory, a component of Bandura’s (1977) larger social cognitive learning theory, as the theoretical framework for developing their instructional treatment for novice Arduino users. Bandura (1986) defined self-efficacy as a person’s confidence in their ability to perform a particular behavior or task. Individuals with high self-efficacy are confident in their ability to successfully complete the behavior or task while those with lower self-efficacy are less confident. Bandura (1986) posited that a person’s self-efficacy for a particular behavior or task was influenced by three types of experiences: mastery, vicarious, and social persuasion. Mastery experiences have the strongest influence on self-efficacy and occur when an individual successfully accomplishes a behavior or task. Vicarious experiences have the second strongest influence on self-efficacy and occur when an individual sees someone they deem like themselves successfully accomplish a behavior or task. Finally, social persuasion experiences, the least powerful influence on self-efficacy, occur when a trusted person such as a teacher expresses confidence in the individual’s ability to successfully complete the behavior or task.

In addition to mastery, vicarious, and social persuasion experiences, Bandura (1986) identified a fourth factor, physiological and emotional state, which affects self-efficacy. According to McKim and Velez (2016), physiological and emotional state refers to an individual’s “internal state and emotions when considering or completing the task” (p. 74). Thus, an individual who approached a behavior or task in a relaxed manner would be expected to have a higher level of task-related self-efficacy than would an individual who approached the same task in a nervous or anxious emotional state.

Application of Self-Efficacy Theory in Instructional Design

Self-efficacy is enhanced when learners approach a task in a relaxed state and have positive mastery, vicarious, and social persuasion experiences (Bandura, 1986; McKim & Velez, 2016). Thus, facilitating this relaxed approach and providing these positive experiences during the lesson and subsequent laboratory activity were a central focus in the original design of the instructional treatment (Johnson et al., 2022). This same focus and procedures, outlined below, were used in this replication.

Lesson. The 40-minute lesson was presented on the first day (Monday) using the same 12 PowerPoint slides developed by Johnson et al. (2022). The lesson was presented enthusiastically in a confident, positive manner to promote a positive physiological and emotional state among the

students. The instructor expressed confidence that students would enjoy learning circuit breadboarding and Arduino programming and would be successful in completing the laboratory activity.

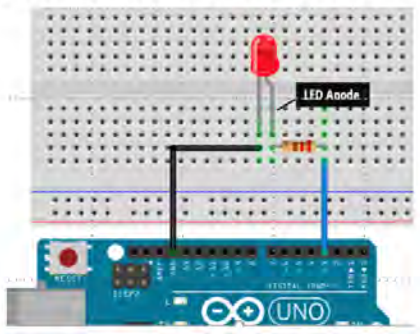
To provide mastery, vicarious, and social persuasion experiences during the lecture, each pair of students received a package containing an Arduino UNO, pin connector wires, one 240-ohm resistor, one LED, and two paper copies of a mock-up of the Arduino Integrated Development (programming) Environment (IDE) for use during the four hands-on practice tasks incorporated into the lecture (Figure 2). The practice tasks were: (a) point to the primary components of the Arduino UNO, (b) identify resistors and the anode (+) and cathode (-) terminals of the LED, (c) breadboard a complete resistor-LED circuit between a specific digital pin and ground pin on the Arduino UNO, and (d) write an Arduino program (in pencil on the paper mockup of the Arduino IDE) to cause the LED to blink repeatedly with a 1-second delay. These were the same four practice activities used in the Johnson et al. (2022) study. Students were successfully guided through each practice activity (mastery experiences), the instructor publicly recognized students as they correctly completed each practice activity (vicarious experiences), and the instructor provided verbal statements of confidence that students could successfully complete each practice activity (social persuasion experiences). At the end of the lesson, three pairs of students were selected to bring their breadboarded circuits to the front of the room, enter their programs into the Arduino IDE on the classroom computer, download the programs to their Arduino UNO, and demonstrate the operating circuit to the class. All three circuits and programs worked (mastery and vicarious experiences) and the instructor expressed confidence that all the students' circuits and programs would work equally well (social persuasion experiences).

Figure 2

Example Lesson Slide with Instructions for Hands-on Practice Task

Breadboarded LED/Resistor Circuit Controlled by the Arduino UNO

- The 240 Ω resistor and the LED are wired in series between digital pin #3 and GRD (ground)
 - Note: Any digital Pin # could be used
- The 240 Ω resistor is required to limit the amount of current that flows to the LED



Activity: Use the pin connector wires, resistor, and LED to "breadboard" the circuit as shown in the drawing.

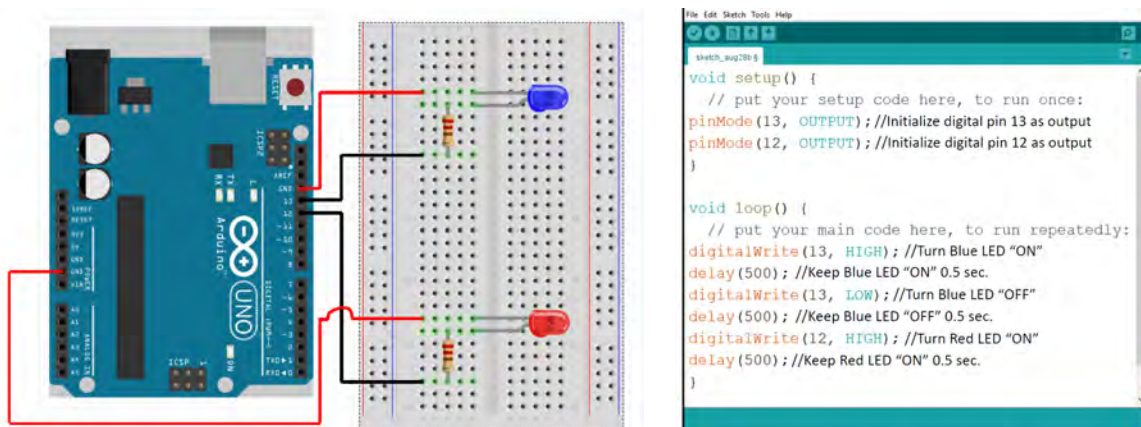
Laboratory Activity. On the second day (Wednesday) of the instructional treatment students met in a college computer laboratory to complete the same circuit breadboarding and Arduino programming activity used in the original study (Johnson et al., 2022). The activity required students to work alone to construct two LED (one blue LED and one red LED) circuits on the same breadboard and program the Arduino UNO to cause the LEDs to blink on and off in a specific order at a specified interval. Students were provided with a written activity sheet; a one-

page student reference showing a pictorial drawing of a single resistor and LED circuit and the generic forms of the three Arduino program commands required to program the circuit; an Arduino UNO, breadboard, and all necessary supplies to construct the circuits; and a computer with the Arduino IDE loaded. Students had 45 minutes to complete the laboratory activity. Prior to allowing students to begin, the instructor reviewed the laboratory activity and expressed confidence that the students would be able to successfully complete the activity (social persuasion experience). As students worked, the instructor made positive and encouraging comments (social persuasion experience); as students successfully completed the laboratory activity (mastery experience), the instructor held the operating project in the air and announced successful completion (vicarious experience). Once students either successfully completed the laboratory activity or time expired, students submitted their breadboarded circuits and copied their Arduino sketches into an online form and submitted them for grading.

Debriefing. On the third day (Friday), students were debriefed on the laboratory activity. A PowerPoint slide with a pictorial drawing of a correctly breadboarded laboratory circuit and a correctly written Arduino sketch was displayed and discussed (Figure 3). The instructor displayed and operated four correctly breadboarded and programmed student projects (mastery and vicarious experiences) and made positive and encouraging comments about student performance on the laboratory activity (social persuasion experience). The debriefing ended with a brief (5 minute) mini lecture on applications of microcontrollers and embedded computing in agriculture.

Figure 3

Slide Showing Example Breadboarded Circuit (left) and Arduino Sketch (right) for Laboratory Activity



Purpose and Hypothesis

The purpose of this study was to replicate and extend previous research by Johnson et al. (2022) which found that an instructional treatment based on Bandura's (1986) self-efficacy theory increased novice Arduino users' interest, self-efficacy, and knowledge. The following directional null hypothesis was formulated for testing at an experiment-wise error rate of .05:

H₀: An instructional treatment (lesson and activity) will not significantly ($p \leq .05$) increase novice users' (a) interest in Arduino, (b) breadboarding self-efficacy, (c) Arduino programming self-efficacy or (d) Arduino knowledge.

This study also sought to describe students' performance on the laboratory activity for (a) circuit breadboarding, (b) Arduino programming, and (c) compatibility between the breadboarded circuit and the Arduino program, and to determine students' qualitative reactions to the instructional treatment.

Methods

The population for this study consisted of novice Arduino users enrolled in introductory agricultural systems technology courses in US universities. The accessible sample consisted of students ($n = 52$) enrolled in one introductory agricultural systems technology course at University A from the original study (Johnson et al., 2022) during the fall 2022 semester. Following IRB approval, 44 students consented to participate in the study and 35 students completed all research activities. Because the focus of this study was on novice Arduino users, three students who reported previous experience with Arduinos were eliminated from the study, leaving 32 students in the final data set.

Research Design and Data Analysis

Because the researchers deemed it unethical to withhold the instructional treatment from one group of students as a control, this study used a pre-experimental one-group pretest-posttest design (Campbell & Stanley, 1963). According to Christensen (1985), this design is useful “in situations in which it is impossible to obtain an equated comparison group” (p. 160). Flannelly et al. (2018) indicated the one-group pretest-posttest design is “probably the most common design used in [medical] program evaluation studies (p. 117), while Seifert et al. (2010) found this design was used in “about 25 percent of the published college impact articles in four major higher education journals” (p. 12).

Campbell and Stanley (1963) list history, maturation, and testing as primary threats to the internal validity of the one-group pretest-posttest research design. Because of the short duration (5 days) of the study, history and maturation should not have posed significant threats. Campbell and Stanley define the threat of testing as “the effects of taking a test [pretest] upon the scores of a second test [posttest]” (p. 5). Although testing cannot be completely ruled out as a potential threat in the current study, using data from the original study (Johnson et al., 2022) where only one group completed the pretest, the researchers determined there was no significant difference [$t(26) = -0.12, p = .90$] in Arduino knowledge posttest scores between students who completed the knowledge pretest ($M = 73.3\%$, $SD = 18.6\%$) and students who did not complete the knowledge pretest ($M = 74.2\%$, $SD = 22.2\%$). This result also provides evidence against the interaction of testing and treatment as a threat to the external validity of the study.

A series of four paired t -tests were conducted to test parts a – d of the null hypothesis. To maintain an experiment-wise error rate of .05, the Bonferroni correction was applied, and each individual paired t -test was tested at an alpha level of .0125 (Field & Miles, 2012). Descriptive

statistics were used to describe student performance on the laboratory activity and open coding (Williams & Moser, 2019) was used to analyze student comments.

Instrumentation

The pretest and posttest versions of two instruments developed for use by Johnson et al. (2022) were used in this study. The first instrument contained sections designed to measure students' Arduino interest, circuit breadboarding self-efficacy, Arduino programming self-efficacy, and student demographic characteristics. The interest scale, adapted from Gable and Roberts (1983), contained 13 items measured on a 1 (strongly disagree) to 5 (strongly agree) Likert-type scale. The breadboarding self-efficacy scale contained eight items, developed by Johnson et al., measured on a 1 (very unconfident) to 5 (very confident) Likert-type scale. The programming self-efficacy scale, adapted from Kittur (2020), contained 13 items measured on a 1 (very unconfident) to 5 (very confident) Likert-type scale. The final section on the pretest elicited demographic information about respondents' academic classification, gender identity, previous programming experience, and whether students had previous experience with Arduinos. The pretest and posttest versions of this instrument were identical except that, on the posttest, the demographic section was replaced with an open-response item inviting students to share written comments about Arduinos and their experiences during the instructional treatment.

The second instrument consisted of two versions of an 11-item multiple-choice test, with four response options per item, used to measure student knowledge before and after the instructional treatment. All items were the same on both tests with the response options re-ordered on the posttest. Both test versions contained a 12th item asking students to rate their level of confidence (1 = not at all confident, 2 = fairly confident, or 3 = extremely confident) their answers were correct.

All instruments and scales used in the original study (Johnson et al., 2022) were examined by a panel of three experts in engineering education who were informed about the objectives of the study, the research procedures, and the characteristics of the research participants. The panel judged all instruments and scales to possess face and content validity. As shown in Table 1, the Arduino interest, breadboarding self-efficacy, and programming self-efficacy had high coefficient alpha reliabilities. The KR-20 reliability estimate for the Arduino knowledge posttest was low but higher than the typical mean of .50 for teacher-made tests (Frisbie, 1988). The low reliability of the Arduino knowledge pretest was consistent with guessing by novice students with little knowledge in the domain being tested (Paek, 2015). This was confirmed by the mean pretest score of 27.3% correct which was not significantly different ($z = 0.30, p = .76$) from the theoretical score of 25.0% by random guessing, and further substantiated by responses to the 12th item on the knowledge pre-test where 81.5% of students indicated they were 'not at all sure' their test responses were correct.

Table 1

Pretest and Posttest Reliabilities for Scales used in the Study

Instrument or Scale	Pretest	Posttest
Interest in Arduino	.87 ^a	.89 ^a
Breadboarding self-efficacy	.98 ^a	.91 ^a
Programming self-efficacy	.93 ^a	.95 ^a

Arduino knowledge	.14 ^b	.62 ^b
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^a Coefficient alpha reliability estimates. ^bKR-20 reliability estimates.

In addition to the pretest and posttest instruments, the course instructor used the rubric developed by Johnson et al. (2022) to score the student artifacts (breadboarded circuit and Arduino program) created during the laboratory activity. The rubric consisted of 10 items for scoring circuit breadboarding, 14 items for scoring the Arduino program, and 2 items to score compatibility between the breadboarded circuit and the program. Each item was scored as being correct (1 point) or incorrect (0 point).

Study Procedures

This study was conducted over three class meetings during the 12th week of classes in the fall 2022 academic semester. At the beginning of class on the first day (Monday) students were presented with a brief (2 – 3 minute) illustrated lecture introducing microcontrollers and embedded computing systems in agricultural machinery. The instructor held up an Arduino UNO microcontroller and informed the students they were going to spend the week learning to breadboard electronic circuits and program the Arduino UNO. After this brief introduction, students completed pretest versions (paper and pencil) of the interest and self-efficacy and Arduino knowledge instruments. Next, packages containing an Arduino UNO, pin connector wires, one 270 Ω resistor, one LED, and a paper mock-up of the Arduino programming environment were distributed to every pair of students and the illustrated lecture with hands-on practice tasks was presented.

On the second day (Wednesday) students reported to a college computer lab in two nearly equally sized groups and completed the hands-on laboratory activity. After introductory comments, students had 45-minutes to complete the activity. Students were seated at every other computer station and worked individually. The only assistance provided by the instructor was to help students identify, if necessary, the computer port to which the Arduino was connected so they could download their programs.

On the third day (Friday) students were debriefed on the laboratory activity. Following debriefing, students completed posttest versions (paper and pencil) of the interest and self-efficacy and Arduino knowledge instruments.

Results

Of the 44 students who consented to participate in the study, 35 (80.0%) were present all three class periods and completed all required class and research activities. Because the focus of this study was on novice Arduino users, three students (8.6%) who reported previous hands-on experience with Arduinos were eliminated from the study, leaving 32 observations in the data set for further analysis.

Although the introductory agricultural systems technology course in this study is a freshman-level course, a majority of the 32 novice Arduino users were either juniors (41.9%) or seniors (16.1%); freshmen (12.9%) and sophomores (29.0%) comprising a minority of students. Almost

two-thirds of these students identified as male (65.6%) and over three-fourths (77.4%) reported no previous experience with any type of computer programming.

Null Hypothesis (Parts a – d)

Student interest in learning about Arduino was measured on a 1 (strongly disagree) to 5 (strongly agree) summated Likert-type scale, administered before and after the instructional treatment. As shown in Table 2, students had an above average level of agreement ($M = 3.52$) they were interested in learning about Arduino prior to instruction; the level of agreement increased ($M = 4.11$) after instruction. The results of a paired t -test indicated the increase in student interest was statistically significant ($p < .001$) and the Cohen’s d of 1.12 indicated a large effect (Cohen, 1988) for the instructional treatment on student interest. Based on these results, subpart a of the null hypothesis was rejected.

Table 2

Student Interest in Learning about Arduino Before and After Class and Lab Instruction

Measurement	n	M	SD	t	p	Cohen’s d
Before Instruction	32	3.52	0.48	6.35	<.001	1.12
After Instruction	32	4.11	0.54			

Note. Interest was measured on a 13-item summated scale where 1 = Strongly Disagree and 5 = Strongly Agree.

Student breadboarding self-efficacy was measured on a 1 (very unconfident) to 5 (very confident) summated Likert-type scale. As shown in Table 3, the mean student score of 1.89 indicated students had only slight confidence prior to instruction; after instruction, the mean student score of 4.43 indicated students were very confident in their circuit breadboarding abilities. The results of a paired t -test indicated the increase in breadboarding self-efficacy was statistically significant ($p < .001$) and the Cohen’s d of 2.22 indicated a large effect (Cohen, 1988) for the instructional treatment on breadboarding self-efficacy. Based on these results, subpart b of the null hypothesis was rejected.

Table 3

Student Circuit Breadboarding Self-Efficacy Before and After Class and Lab Instruction

Measurement	n	M	SD	t	p	Cohen’s d
Before Instruction	32	1.89	1.10	12.53	<.001	2.22
After Instruction	32	4.43	0.60			

Note. Breadboarding self-efficacy was measured on an 8-item summated scale where 1 = Very Unconfident and 5 = Very Confident.

Student Arduino programming self-efficacy was also measured on a 1 (very unconfident) to 5 (very confident) summated Likert-type scale. As shown in Table 4, the mean student score of 1.92 indicated only slight confidence prior to instruction; after instruction, the mean student score of 3.95 indicated students were moderately confident in their Arduino programming

abilities. The results of a paired *t*-test indicated the increase in programming self-efficacy was statistically significant ($p < .001$) and the Cohen's *d* of 1.88 indicated a large effect (Cohen, 1988) for the instructional treatment on programming self-efficacy. Based on these results, subpart c of the null hypothesis was rejected.

Table 4

Student Programming Self-Efficacy Before and After Class and Lab Instruction

Measurement	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Before Instruction	32	1.92	0.82	10.65	<.001	1.88
After Instruction	32	3.95	0.69			

Note. Programming self-efficacy was measured on a 13-item summated scale where 1 = Very Unconfident and 5 = Very Confident.

On the knowledge posttest, 96.9% of students were either 'fairly' (71.9%) or 'extremely' (25.0%) confident their responses were correct. The mean student score on the Arduino knowledge pre-test was 27.3% and the mean posttest score was 80.7%. This increase was significant ($p < .001$) (Table 5). The Cohen's *d* of 2.79 indicated a large effect (Cohen, 1988) for the instructional treatment on Arduino knowledge. Based on these results subpart d of the null hypothesis was rejected.

Table 5

Student Knowledge Before and After Class and Lab Instruction

Measurement	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Before Instruction	32	27.3%	13.5%	15.78	<.001	2.79
After Instruction	32	80.7%	15.6%			

Note. Student knowledge was measured as the percentage correct on an 11-item multiple choice test with 4 response options.

All subparts (a – d) of the null hypothesis were rejected. Thus, the researchers concluded the instructional treatment based on self-efficacy theory (Bandura, 1986) was successful in significantly ($p \leq .001$) increasing novice users' (a) interest in Arduino, (b) breadboarding self-efficacy, (c) Arduino programming self-efficacy, and (d) Arduino knowledge. The increase in each area represented a large effect (Cohen, 1988) for the instructional treatment.

Student Performance on the Breadboarding and Programming Activity

The hands-on laboratory activity was evaluated using a scoring rubric with each item scored as either correct (1 point) or incorrect (0 point). The mean scores were 9.88 ($SD = 0.55$) on the 10-item breadboarding section of the rubric, 13.50 ($SD = 2.48$) on the 14-item programming section of the rubric, and 1.97 ($SD = 0.18$) on the 2-item breadboarding and program compatibility section of the rubric. Twenty-eight of 32 (87.5%) students successfully completed the hands-on Arduino laboratory activity and made perfect (100.0%) scores on the breadboarding, programming, and compatibility sections of the evaluation rubric. The four students who did not successfully complete the laboratory activity made minor programming syntax errors (two

students), compatibility errors in initializing the wrong digital pin (two students), and breadboarding errors by reverse-biasing the LEDs (one student).

The level of student performance on the laboratory activity was consistent with the findings of significant ($p \leq .05$) increases in student interest in Arduinos, programming self-efficacy, breadboarding self-efficacy, and Arduino knowledge previously reported. Of particular interest, the level of student performance on the laboratory task was consistent with the increased level of Arduino knowledge as measured by the lower-reliability tests of cognitive knowledge.

Student Comments

In addition to quantitative data on interest, self-efficacy, knowledge, and task performance, students were invited to share any written comments they had related to learning about Arduino UNO microcontrollers, breadboarding electronic circuits, or programming the Arduino UNO. Twenty-six (81.2%) of the novice users provided one or more written comments on the after-instruction survey with all (100.0%) of these comments categorized as positive.

Fourteen (53.8%) students commented that they ‘liked,’ ‘enjoyed,’ or ‘loved’ learning about Arduinos. Example comments included:

- I liked learning about the Arduino UNO. At first, I did not understand the importance but now its cool that I know they [microcontrollers] are all around us. And I really liked actually getting to do it in the lab.
- I really enjoyed learning how to program the Arduino UNO. I felt very proud of myself after I had completed the project successfully.
- I loved learning about [A]rduino. It makes me want to invest in buying one and take more classes like this.

Seven (26.9%) students commented on the instructional treatment. Example comments included:

- I thought it was well prepared and laid out.
- This was very straightforward and easy for me to follow. Personally, I would have liked more of a challenge but that may not be possible for the others.
- No further comments: clear instruction[s] and simplified methods worked well.

Five (19.2%) students commented on the usefulness of learning about Arduinos and microcontrollers. Example comments included:

- One of the more useful things I have learned in college.
- Overall, this was a great experience, and I learned a lot. I feel like this could definitely come in handy someday for me when I’m around machinery.
- Arduino is easy to learn, and I believe I can use this information and Arduino in the future.

Finally, four (14.3%) students commented they would have liked to spend more time more learning about Arduino. Example comments included:

- [I] liked learning about it a lot – wish we had spent more time on it.
- I think if it [instruction] could be one day longer that would be helpful.

Conclusions and Recommendations

This study replicated research by Johnson et al. (2022) to determine if an instructional treatment, based on self-efficacy theory (Bandura, 1986), would significantly ($p \leq .05$) increase students' interest in Arduino, circuit breadboarding self-efficacy, Arduino programming self-efficacy, and knowledge about Arduino. The study was conducted with a different sample drawn from the same population at University A used in the original study.

The results were consistent in that the modified instructional treatment produced the same results as when used at University B in the original study (Johnson et al., 2022). Namely, the instructional treatment had a significant ($p \leq .001$) and large (Cohen, 1988) effect and resulted in increased student interest in Arduino, circuit breadboarding self-efficacy, Arduino programming self-efficacy, and knowledge about Arduino. In addition, student performance on the laboratory task was excellent, with high scores on the breadboarding (98.8%), programming (90.0%), and compatibility (98.5%) sections of the rubric. Additionally, 28 of 32 (87.5%) students scored 100.0% on the rubric and produced laboratory projects that functioned as intended. This represents a substantial improvement over the 52.9% success rate reported by Sadler et al. (2017) on a less complex Arduino activity.

In addition to the quantitative results, open coding (Williams & Moser, 2019) of students' written comments on the posttest survey indicated that students responded positively to learning about Arduino and the instructional treatment. All student comments were classified as positive, with over one-half (53.8%) of the 26 students providing written comments indicating they 'liked,' 'loved,' or 'enjoyed' learning about Arduinos. Substantial percentages of students also commented that the instructional treatment was clear (26.9%), learning about Arduino would be useful (19.2%), or that they would like to spend more time learning about Arduinos (14.3%). Thus, the qualitative and quantitative results were consistent in pointing to the effectiveness of the instructional treatment.

This study confirms the results of Johnson et al. (2022). An instructional treatment based on Bandura's (1986) self-efficacy theory increased Arduino interest, self-efficacy, and knowledge. Breaking larger tasks into smaller, properly sequenced subtasks and allowing students to experience success in each subtask provided multiple opportunities for positive mastery, vicarious, and social persuasion experiences, increasing student interest, self-efficacy, and knowledge. In addition, these sequential subtasks, along with instructor enthusiasm and expressed confidence in student performance, promoted the positive physiological and emotional state associated with increased student self-efficacy.

Given the consistent positive student outcomes from the original (Johnson et al., 2022) and present replication studies, educators should consider Bandura's (1986) self-efficacy theory when teaching technical or otherwise difficult content to novices. Based on the positive relationships between interest, self-efficacy, and student performance (Johnson et al.; Lane et al., 2002; Ryan & Deci, 2000; Smith et al., 2006), attention to self-efficacy theory in the design and delivery of instruction should enhance both cognitive and affective student outcomes.

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Experiences from a Land-Based Learning Project Focused on Local Food Interventions

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Abstract

In this paper, we explored an innovative educational approach, land-based learning (LBL), in which students, teachers, and community members engaged in understanding and addressing an authentic food-based problem within their local community. The LBL implementation of interest engaged two teachers and their respective students in northern Michigan, their school's respective food service directors, two local farmers, and a Michigan State University extension educator to form Locally Integrated Food Teams (LIFTs). Each LIFT worked with their student members to develop a shared understanding of the local food system and school lunch sourcing and to identify an intervention to increase the amount of local food in their school lunches. LIFT students proposed their intervention to Michigan State University faculty, implemented their intervention, and presented the results of the intervention during an educational wrap-up day at the Upper Peninsula Research and Extension Center. To explore the experiences of LIFT members, we carried out a case study with focus group and observational data from the bounded system (i.e., LBL project). Data were transcribed and then analyzed using an inductive coding process. Through the findings, we explore the authentic, empowered student experiences cultivated by the LBL project and conclude with a call for broader application of LBL in Agriculture, Food, and Natural Resources Education.

Introduction

Food, and what the general population learns about agriculture, the environment, and nutrition through education are part of a complex socio-environmental system (Chase & Grubinger, 2014; Pauley et al., 2019; Roberts et al., 2016). Complex systems are dynamic, meaning changes to one part may have unforeseen consequences for another part of the system (Rittel & Webber, 1973). How we shape food systems—by practicing traditional foodways, exercising consumer choice, and enacting policies and regulation—will require not only special knowledge, but skills to actualize systemic change. The food system will soon be in the hands of youth who are in school now, and their decisions will have significant impacts for food justice, climate change, and the health of the general population.

Schools have significant potential to prepare students to address the complex problems they will inherit. Food is related to students' lives and many academic subjects; issues in food system sustainability are present in some form in every community for students to practice intervening to improve food system sustainability. While the subject of "food systems" is not a universally recognized curriculum topic, educators already teach about food and agriculture, with or without state standards in place to promote their inclusion in classroom instruction (Stewart et al., 2021). Ideally, students would learn about how to change food systems to improve health outcomes and

correct inequities within the context of their communities, rather than viewing the food system as a static, invisible background to daily life.

There are multiple paths by which students could learn about food systems in U.S. high schools that situate complex problems in relation to place, but each path tends to operate with a different focus. School-Based Agricultural Education (SBAE) programs have been encouraged to incorporate service-learning projects that support their communities (Roberts & Edwards, 2015), a tradition with renewed potential amid calls for SBAE to shift attitudes and practices to remain relevant (Hartmann & Martin, 2021). Place-Based Education (PBE) is sometimes used in an environmental education context to explore food systems, particularly by relating ecosystem features to agriculture through agroecology, forestry, water quality, or invasive species management (Ferguson et al., 2019; Smith, 2011). Farm to School provides opportunities for students to learn about and experience local food in their curriculum and school meals through strategies which include procuring locally produced food, creating student-run school gardens that teach students about food production and preparation, other experiential learning activities such as farm visits with local producers, and promotional activities such as local food taste tests or farmers visits at the school (Prescott et al., 2020). It is also important to acknowledge some teachers incorporate food systems education independently, without connection to a national program. To some degree, each of these strategies value locally created knowledge over standardized curricula (McKim et al., 2019), allowing students to become aware of specific sustainability issues that exist in their local food system. Each approach provides a critical dimension of education about food systems, but do they ask students to practice strategies that operationalize changes to food systems to enhance community sustainability?

The next generation must be empowered to deal with complex problems through educational experiences which position students to practice sustainable change in collaboration with community partners. In the current study, we explored an innovative educational approach, land-based learning (LBL), which affords students the opportunity to collaborate with community partners to enact sustainable change within their local food system. Results from this research will inform the efficacy of LBL and its potential to develop students' ability to address complex problems.

Literature Review

This literature review explores how complex problems are part of national research agendas in agricultural and environmental education and identifies practices that center students as agents of change.

Agricultural education recognizes complex problems

The American Association for Agricultural Education (AAAE) has identified using systems thinking as an important approach to “Addressing Complex Problems” in its national research agenda. Critical challenges identified include land use, agricultural production, natural resource management, energy consumption, and climate change (Roberts et al., 2016). According to Roberts et al., there is a dual gap in agricultural education: a lack of understanding about how educators should be preparing students to address complex problems, intensified by a gap in the

literature, which does not provide sufficient information on processes, procedures, and programs that educators could utilize.

An additional conversation is taking place in agricultural education about how social justice is entwined with teaching and learning. Researchers say other disciplines are using agriculture to talk about climate change and the history of racism in the U.S., while SBAE is losing relevance because of its narrow focus (Hartmann & Martin, 2021). SBAE should embrace conversations about sustainability by incorporating a critical pedagogy of agriculture, which would encourage students to see themselves as capable of changing the social realities of current agricultural systems (Hartmann & Martin, 2021). This could be started by changing SBAE classroom curriculum, FFA, and Supervised Agricultural Experiences, while also recognizing that without larger systemic support from National FFA, individual teachers will work against the prevailing winds in the discipline to accomplish localized change (Hartmann & Martin, 2021). Though adjustments to FFA would be a centralized approach to changing the practices and power structure of agriculture in the U.S., some teachers outside SBAE are providing students with tools to think critically about food systems.

Transformational change in food systems initiated by students will require agricultural education programs engage participants at multiple levels to generate interventions relevant to their communities. To this end, farm to school programs may provide valuable insights for developing more relevant agricultural education programs. Farm to school programs operate at the intersection of curriculum development and direct food system intervention, creating a range of community benefits beyond educational outcomes for students (Mishra et al., 2022). Local food procurement in schools, a strategy common to farm to school programs, has been found to increase local economic activity by providing local producers a stable source of income and encouraging consumer dollars to circulate locally (for instance, see Christensen et al., 2019). Researchers have also consistently observed farm to school programs increase the consumption of fresh fruits and vegetables, both in school and out-of-school settings (Mishra et al., 2022). Beyond these individual behaviors, many farm to school programs utilize their interventions as a useful contrast to the challenges facing the current food system, raising food literacy among students, and leading some scholars to suggest that farm to school programs may be one avenue for advancing the aims of the food sovereignty movement (Powell & Wittman, 2018).

Service Learning

In practice, agricultural education has a rich history of doing things that help others in practical terms like installing mailbox posts, plumbing homes for running water, or building outdoor classrooms (Roberts & Edwards, 2018). The practice of identifying community needs and engaging students in projects that answer those needs has been called different names throughout the decades and has been lauded as a beneficial aspect of agricultural education with a “victory narrative” that spans almost a century in the agricultural education literature (Roberts & Edwards, 2015, 2018). Because students and teachers enjoyed the work and community members benefited in tangible ways, the projects have been remembered as successful.

Service learning also has barriers to implementation: the amount of time it takes for educators to design a sound program and to engage students in reflection so they can experience realizations

about how power and status function in their communities. Even when carried out well, such projects can serve students more than serving the community's urgent needs (Gray et al., 2012). Service learning, despite promotion from levels above the individual classroom or school district such as National FFA, is not universally adopted and it remains to be seen if its incorporation into the three circle model results in what it promises to deliver – if service learning “really is more than the sum of its parts” (Roberts & Edwards, 2015). A process for evaluating the effectiveness of service learning in systems change has yet to be presented.

The history of service learning offers significant examples of students getting involved in their communities in practical and beneficial ways. However, a horticulture program raising vegetables and selling at a farmers’ market to fund a scholarship or donating the produce to a local food bank does not necessarily ask students to act systemically on the question of why, when food accounts for almost a third of the waste in the U.S., there are hungry people. Confusing service learning with “community service” or “volunteerism” may be a common interpretation in practice (Roberts & Edwards, 2015). The argument has been made that facilitating a space for students to engage with the community results in project partners, including students, who have “reframed relations of power while also questioning the status quo” (Roberts & Edwards, 2018, p.25). Agricultural education is aware of the need to engage with social-environmental systems and has called for further research into practical approaches that center student agency during the problem-solving and decision-making process.

Agricultural Education and Environmental Education’s Shared Operating Space

Agricultural education and environmental education both relate to land: how people are taught to think about, benefit from, and treat our shared home. Scholars have proposed ways to invite teachers and students into the nexus of agricultural, environmental, and community sustainability in research and in practice. By aligning the AAAE National Research Agenda with systems thinking, scholars hope to see agricultural education move from individual resilience to community-wide and systemic resilience (Pauley et al., 2019). Environmental education has enumerated practices for how agricultural education and environmental education could collaborate through shared research agendas, joint conferences, and working together on curricula to pull each discipline from its silo and into meaningful conversation about teaching sustainability in the shared space of the land as a social-ecological system (Reilly et al., 2022).

Agriculture and Place Based Knowledge

Place based education has been applied to agriculture in educational settings through school gardens. Research in agroecological scaling in formal educational systems has shown the potential to bridge lived experience of food, farming, and place with scientific ways of knowing (Ferguson et al., 2019). One of PBE’s strengths is that it eschews or adapts “universal knowledge” curricula developed in places remote from a specific educational setting, far from where students learn and live, to “link local knowledge with scientific thought and respect for place” in a specific setting (Ferguson et al., 2019, p. 726). From this same study the concept of “dialog of knowledge” in which groups of people can speak horizontally is identified as a technique to be incorporated in PBE teacher training. When students and teachers become curriculum creators, they can connect to the place they live by "reinhabiting," a mode which is a

more difficult proposition to evaluate than outcomes based on test scores (Gruenewald, 2003). Learning that is based solely in the classroom is inadequate to the cultural and ecological analysis required for decolonization of the mind (Gruenewald, 2003). A critical pedagogy of PBE offers the reminder that advocating for change with youth must be approached with care.

Change interventions should be rooted in empathetic experience. *Premature abstraction* or asking students to dive into big crises and solve problems before they have had a chance to situate themselves in the place they currently occupy, and “to fall in love” with that place can result in overwhelm and disengagement (Sobel, 1996). Educators are responsible for contextualizing problems and making developmentally appropriate choices when it comes to asking students about addressing complex problems. PBE asks educators to reflect on questions like, how does your teaching influence the place you live and what you leave for future generations? (Gruenewald, 2003). PBE asks an entire community to “take responsibility” for teaching about the possibilities of adulthood in their community (Smith & Sobel, 2010). Evaluating teacher, student, and community preparedness for engaging in food systems change is not specifically discussed in the literature. However, PBE in practice has had significant success in developing relationships between students and the places they live, opening a space for further experiences in creating sustainable changes.

The need for agricultural education learning experiences which engage students in the critical work of community change is evident. Existing scholarship on service learning, farm to school, and place based education provided a foundation for the development of LBL in agricultural education (McKim et al., 2019). In the current study, we explored the application of LBL in Michigan’s Upper Peninsula (UP) to uncover insights into the efficacy of this educational approach.

Theoretical Background

Secondary education in the U.S. does not have a unified approach to teaching the skills to understand and influence complex systems in the context of food and agriculture, and so there is opportunity for further experimentation based on teacher interest in innovative programs and need for funding for ongoing agriculture and food education activities. LBL is an approach that has been piloted to center students in the process of creating food systems change. LBL is a flexible process for building student-led teams that act on sustainability issues through four stages: (a) *identification* of a local phenomenon and partners, (b) *understanding* of place and connected systems, (c) place-based *intervention* to enhance sustainability, and (d) *evaluation* of changes in place, systems, and community (McKim et al., 2019). Since 2017, project leaders have been engaged with students who do not have access to SBAE in the Michigan UP to carry out projects in collaboration with food systems actors with a focus on social, ecological, and economic sustainability for partnering farms (McKim et al., 2019).

The implementation of LBL within schools in the UP provided the “case” for our study. Specifically, we evaluated a LBL project comprised of two independent Locally Integrated Food Teams (LIFT). Each LIFT team had an AFNR educator and corresponding class of students, their respective school food service director, a local farmer, nutrition educator, and a Michigan State University Extension Educator. LIFTs were engaged in a six-month experience which

walked through the four stages of the LBL process. Specifically, LIFTs *identified* the stakeholders involved in local food production and cafeteria food procurement; worked to *understand* the challenges and affordances of cafeteria food and local food production systems; developed, proposed, and implemented an *intervention* to increase local food offerings in the school cafeteria (i.e., extending the growing season of the school's hoop house – which supplies food to the school cafeteria - through heat piped from the school's boiler room [School 1] and purchasing and operating a classroom-managed hydroponics unit [School 2]); and *evaluated* the impact of their intervention on local food consumption within the cafeteria. LIFT teams were provided a mini grant to implement their intervention.

Methods

Given the unique approach to this LBL project, a case study design was implemented to gain the perspectives of those involved in the bounded system. Described by Merriam (2002) as a “description and analysis of a phenomenon” (p. 8), case studies may focus anywhere on the continuum from individuals to institutions to communities. In our study, the unit of analysis selected was a LBL project engaging high school students and their respective teachers, food service directors, local farmers, and Michigan State University (MSU) Extension and Faculty members in AFNR. This project was supported by funds from the United States Department of Agriculture (USDA). All research activities were approved by MSU Institutional Review Board prior to initiating the project.

Subjectivity Statement

Our research team was comprised of faculty, extension educators, nutrition educator, and one undergraduate researcher, all of whom were engaged with the delivery of the project. Our team members worked directly with teachers and their students, with one of our team members also working directly with the food service directors and local farmers. Therefore, each member of our team had a vested interest in the success of the LBL project and personal connections with participants in the project. As a collective, we believed in the ability and agency of students, teachers, farmers, and food service directors to carry out the functions of this project.

Participants

Participants included teachers, students, and food service directors from rural school districts in Michigan, purposively selected due to their location in a rural area of Michigan and the presence of AFNR Education coursework. Two schools participated, with one teacher and corresponding class of students each, with 33 students in total (all of whom were enrolled in an AFNR class and ranged from sophomores to seniors). Each school's food service director engaged with the project, and one local farmer in each community was invited to the LIFT team based on prior relationships with Michigan State University Extension Educators.

Data Collection

Three types of data were collected: (a) focus groups with each LIFT team member type (i.e., students, teachers, food service director, and farmer); (b) LIFT team student presentation

observations; and (c) observations of intervention successes. The three types of data were all gathered during the education day held at MSU UPREC at the conclusion of the project, with two research team members conducting focus groups with students separately, the two teachers collectively, and then jointly interviewing one farmer and one food service director. While all students were present for the education day, one-half of the students from one school were unable to complete the interview due to travel obligations. Additionally, one farmer and one food service director were unable to attend and were not interviewed. Focus groups and interviews followed a semi-structured format, allowing for flexibility (Flick, 2009).

Data Analysis

A handheld recording device was used to capture focus group and interview data, and data were then sent to a third-party transcription service (i.e., TranscriptionStar). Research team member observations informed the data analysis process, with data being inductively analyzed. Open, axial, and selective coding processes were used to identify codes, categories, and themes. We employed open coding procedures reflecting our stage and style of research (Flick, 2009), with one research team member reading transcripts to identify descriptive patterns of data. Those identified patterns then informed a systematic open coding process where data were “disentangled” (p. 307) with concepts added to them, followed by axial and selective coding (Flick, 2009). Two researchers performed open coding with the entire research team meeting to perform thorough peer reviews, achieving consensus for identified codes. Several steps were taken to ensure quality, including peer debriefing, audit trails, member checks, and providing thick descriptions (Flick, 2009).

Findings and Discussion

One theme was identified by the research team: *Students re-envisioning school and local food systems*. Theme, categories, and codes are introduced in Table 1 below.

Table 1

Summary of Themes, Categories, and Codes

Theme	Category	Code
Students Re-Envisioning School and Local Food Systems	Student Interpretation of Experience	Agency Consequential
	Collaboration	Leadership Delegation Problem Solving
	Project Legacy	Continuing Ideas Influence Relationship to Food

Our singular theme informs our research question – what are the experiences of teachers, students, farmers, and food service directors in a LBL project. In this section, we present that theme and corresponding categories and codes with substantiating quotes from participants.

Students Re-Envisioning School and Local Food Systems

The theme we emerged focuses on how the project – and the adults engaged in it – influenced student vision of school and local food. While adults (i.e., teachers, farmers, food service directors, and research team members) played important roles in the LBL project, what emerged was how students were impacted by their experience with the project. This theme is explored by looking at its three categories: student interpretation of experience, collaboration, and project legacy.

Our first category explores how students interpreted the LBL experience, with students making direct juxtapositions to the type of school learning they typically experience. Principal among these connections and interpretations was agency. Students, teachers, and food service directors discussed the existence of, and importance of, student agency to design and implement their own intervention to increase the amount of local food in the school. The perception was students were empowered to design their own experience, in contrast to the usual school experience. A student provided the following when describing the agency felt after their teacher provided an option of adult help or not, “And we decided we don't want any adult help, so we got to do a lot of it on our own.” Continuing, that same focus group elaborated on when adults were pulled in, “And then, you know, we ran it by the adults in order to make sure that that was covered, and that was okay with our [food service director].” The agency, with adult interaction in ways that empowered students, led one group to highlight they felt even more empowered by adult presence in the project, “It felt like we were in charge because the grown ups were involved. It felt like we had more control over our situation.” On a few occasions, students offered the project provided adult-like experiences, “Giving us a chance to work together and work it out like adults or whatever.” Further rounding out the student perspective, a different focus group highlighted agency from the standpoint of actually *doing* the project’s intention, “our goal was to change the food in our lunchroom. And then we actually ended up doing that...” Adult perspectives supported student agency, too, with the food service director highlighting how school-wide connection to the project has resulted in more willingness to dialogue about food options at school,

once this project started, I've noticed the high schoolers being more open to conversing and giving their opinion and just input in general on what they'd like to see on the menu, what they do like, what they don't like.

The second code supporting the student interpretation of experience category is consequential, where the focus of the project led to feelings of mattering for students in contrast to contrived learning situations. One teacher noted how they framed the project for students, “And it's not hypothetical solutions. You're going to do it,” adding for several weeks students said “oh, you mean we're really going to do this?” Students framed the project as “more official” when comparing it to their usual project-type activities in other coursework. Harkening to the adult-like feelings discussed previously, one focus group of students described how outside

professionals impacted their feelings toward the project during their intervention of piping warm air from the school's boiler room to the school's hoop house to extend the growing season, ...that's kinda when I thought like um, wow this actually is kinda like serious, we're actually doing something big here. Yeah, like, when we had to get [administrator], and started talking about making a hole in a wall, um, that's ... And a bunch of older more official, like, professional people came in to talk to us about, like, what we were gonna do and everything, and of course, um, Abbey, I think it is came in a lot to talk to us about it. Finally, rounding out the consequential code, one student offered the project "actually makes an impact in our community."

Our second category, collaboration, transitions away from how the project was facilitated and moves toward describing how students engaged with the curriculum and worked to implement their intervention. The first code, leadership, is built on ideas from students positing "all were included" and getting to "participate in something bigger than myself." In some cases, the project led to leadership opportunities by students, "I was definitely, I'd say the more vocal one in the group trying to get people to put out their ideas." One focus group highlighted how the project provided growth opportunities to adjust what leaders do, not necessarily sit back, but a big part of it is taking other people's ideas, and kind of going along with it because I mean, if I was just a leader and then no, my idea only, nobody else – you would get nowhere with that.

Also described were leadership opportunities students engaged in outside the project class, "branching out, we do good things at the beginning of class sometimes in Spanish. So, whenever I got the chance, I would like update my class on what we're doing."

The second code in collaboration we identified was delegation, where students offered the importance of defining roles within teams. One focus group discussed the importance of sub teams, "I feel like the teams evenly split up the projects, and every team had a sort of importance" and that the teams "had their own mission" but "meshed together to make it, you know, more integrated, and everyone was involved." Connected to delegation, the third and final code we emerged was problem solving – even when there was no clear solution. A teacher postulated the coming-to-terms with realizing the solution would not be immediate, we kind of had five phases, um, or five solutions to the one problem. And we realized early on that the product we get from each one of these phases may not be realized this year. You know, it's more of a long-term outlook.

Students offered a more focused discussion on working on compromise to solve issues, "We obviously had some disagreements, but they were worked out throughout the process of talking [about what is happening]." They added, "we were picking at all the bits and pieces to find compromises in-between each group." Lastly, another group highlighted how that dialogue sometimes meant dropping an idea, "[we had an idea to] continue during the summer, like have a summer program, but there was also a couple questions with that one. So, we didn't end up doing that one."

Our final category identifies the legacy of the LBL project, exploring concepts including continuing ideas, influence, and relationship to food. The first, continuing ideas, looks at project continuation within the respective schools as an institution. Students and teachers posited hopes of continuation, with students offering "we prepared things for the future like so, it doesn't end

with us, it continues on to future classes.” Included were specific ideas, such as hoop house expansion, “Hopefully future classes will be able to expand on what we've done this year. It's not perfect, but hopefully they'll make it more efficient...[our teacher will] probably apply for another grant, and... maybe even expand the hoop house.” Students from the other school echoed similar thoughts, hoping to continue the healthy trend, “we'll get other people with different ideas and the school can keep getting better and healthier lunches.” Finally, hinting at inspiration from the project, one food service director also posited continuation thoughts, “one of my, kind of my five-year goal is to be able to have some sort of hydroponics system in each school that I run, um, all the way from elementary to the high school.”

Influence was the focus of our second code within the project legacy category, exploring how engagement in the project influences others in the community and school institution. Teachers, students, the farmer, and food service director all substantiated this code, with teachers offering ideas like “I think, before we started, I think there was like, two staff members eating. Now there's staff members almost eating salad bar on a daily basis,” and “the amount of people talking about their lunch now is way higher.” The farmer saw the project as an opportunity to influence others, “So, this has been an interesting opportunity to influence how people think about food in local food systems, especially in upcoming generations,” while the food service director was excited because the project is in line with the influence they want to make on the food served, “I've been very excited about this, um, project because it has been on my docket to try to get more local produce into the school system.” Lastly, students even put numbers to that influence, tracking a “15% increase of vegetables and fruits being taken at lunch,” with this finding consistent with prior research (Mishra et al., 2022).

The third and final code for the project legacy category explores the relationship to food, and the application of new learning to one's connection to the food system and related careers. The food service director highlighted an educational program on composting as helping develop that relationship,

And the process, seeing the kids learn about the process of composting and how the food waste goes to grow more food. And that was one of the, not so much local food but a local part of the community that really, uh, spoke to me.

Meanwhile, students suggested a growth in career awareness after having participated in the LIFT teams,

Not gonna lie at the beginning, we, I always heard farming, you know, you just kind of think of like the very typical like, oh, you're on a farm, you got to deal with cows, animals, chickens. But I didn't realize that there are so many more, um, opportunities within farming.

One student who hails from a farming background even mentioned how the project has influenced his family's business relationship to the food system, “we're looking into buying stuff from other farmers, and I don't think we ever did that before.” Finally, offering an emblematic quote of the impact of the project, another student from the same focus group offered a new realization about local food, “yeah, I always appreciate local food, I just never realized how difficult it was to get it out there.”

Conclusions and Recommendations

As the next generation engages with food systems as consumers and producers, they will inevitably make decisions within complex systems. High school classrooms have the potential to prepare students for these decisions in ways that embrace complexity and promote student agency *if* students are positioned and supported within their communities as change agents. LBL was developed and implemented to potentially seize this tremendous learning potential. Our investigation exploring the experiences of participants in LBL yielded three conclusions that inform the future of this educational approach.

LBL is a pedagogical approach which promotes student agency and project legitimacy. Student agency, in this case, was beneficial to student learning. Consistently, students expressed agency as unique in educational settings, exciting, and constructive to their learning. During their final project presentations, one student pleaded that more educational opportunities be designed which afford students agency, potentially LBL is a mechanism to achieve this aim more broadly in agricultural education. Educators can employ LBL to structure and engage students in authentic problems situated within their local community, such as asking students to answer the question, “how can we get more local food in the lunchroom?” As students encounter barriers to progress, supportive adults can engage in the classroom in roles that correspond to their professional identity – such as Extension educators, nutrition educators, and farmers with experience in food systems and education. While students are driving the investigation and devising interventions, having a process in place to guide action provides a sense of direction without determining the outcome of the project.

LBL provided an educational approach which promoted student engagement in and ability to influence the local food system. Adults lent power to students, operating as the nearest levers for systems change in the school food environment. The project increased conversations between students and adults about school lunch, what values they share, and helped to define a direction for future community engagement in local food. Additionally, through LBL, students were provided with opportunities to engage in authentic leadership experiences. Recognizing that a project is only as strong as its support, the importance of sharing power, and compromising were understood by students through lived experiences in the project. As students engaged with a real-world problem that had no pre-defined solution, they experienced frustration and authentic responsibility for the outcomes of their collective action. These experiences are expected to help students conduct future open-ended investigations and problem solving in group settings, skills which are urgently needed to address complex problems in the Anthropocene.

Recommendations include recognizing the interest students have in being recognized by adults and helping to make decisions that matter to adults as well as to their peers. By foregrounding student agency in the project through methods such as asking students to lead class discussion or decision-making processes, students feel both empowered to organize for change and also to call on adults when necessary. Students can discover a reasonable and nuanced understanding of their own power in the school environment through LBL projects that run counter to their usual experience in high school classrooms of being asked to perform tasks that are “practice” rather than “for real.”

We recommend the use of LBL should be expanded to engage students in action to shape their school environment and connections between the school and community members. LBL can be

initiated by AFNRE teachers, science teachers, environmental educators, and other educators with the latitude to design their curriculum and the flexibility to take instructional time for projects. Administrators and school board members should support activities which position students in their communities as change agents, and funding should be sought by institutions to support LBL. In addition, we recommend continued evaluation of land-based learning when applied to new contexts (e.g., urban settings, nonformal education spaces, postsecondary education). Importantly, evaluations of LBL should be inclusive of diverse outcomes such as systems thinking, community engagement, leadership skill development, content learning, career interest, empathy, and place identity. All these activities would support increasing the use of pedagogies, like LBL, that critically evaluate systems and engage students in changing those systems for a more sustainable future.

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Disability Inclusion and Awareness in Youth Livestock Expositions

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Abstract

In recent years there has been an increase in the number of children with disabilities participating in livestock exhibitions. Integrating youth with disabilities in agricultural programs can improve social acceptance, self-esteem, and social skills for all youth involved as they can benefit from the opportunity to become more aware of differences and more tolerant and accepting of others. The purpose of this study was to understand and describe the lived experiences of participants in a disability inclusive livestock show and perceived best practices of livestock expositions that are constructed with diversity inclusion towards youth with disabilities. Fifteen semi-structured interviews were conducted with twenty participants involved in a disability inclusive livestock exposition to understand their perceptions and experiences with the program. Results from this study illuminated how disability inclusion in the livestock industry can create disability awareness and acceptance amongst participants to expose them to diverse individuals. This study offers insight on the lived experiences of individuals with and without disabilities along with parent/guardian and adult volunteer perspective on the perceived best practices for disability inclusive livestock expositions.

Introduction/Need for Research

One of the most predominant projects in the 4-H and FFA organizations is the exhibition of livestock. A livestock shows is a “competitive educational activity satisfying the mission of agricultural sciences and cooperative extension by teaching youth the responsibility of caring, feeding, managing and showing through exhibiting livestock projects” (Davis et al., 2005, pg. 10). Livestock shows have been held since the early 1900s and are hosted across “the United States for adults and youth to compare the quality of their animals” (Martin & Rusk, 2021, pg. 64). Youth who raise breeding animals learn tremendous responsibility as they learn how to properly raise their animal to maturity and select the best method for breeding to continue its prosperity in the future (Martin & Rusk, 2021). “Youth who raise breeding or market animals are critically important to the future of the livestock industry. The skills they learn at a young age will pay dividends for many years to come” (Martin & Rusk, 2021, pg. 64).

“In recent years, we have seen an increase in the number of children with special needs participating in youth livestock shows” (Martin & Rusk, 2021, pg. 64). Many individuals with disabilities become involved in exhibiting livestock as livestock shows provide youth with different layers of development and skills (Durian & Fowler, 2020). These skills and benefits include social relations, character, family, exposure to competition, exposure to culture, and finance for education (Davis et al., 2000). Huston (2020) found livestock SAE projects grant “students with the opportunity to practice the skills they learn in the classroom” (pg. 59) and develop students who are “highly efficacious in their abilities” (pg. 59). “There is a positive relationship between years of livestock project involvement and life skills development, as well as leadership development” (Mott et al., 2022, pg. 84). Mott et al. also showcased building relationships with mentors outside the family to form a connection with the community (Mott et al., 2022). Youth involved in caring for livestock may also find a sense of identity through this

responsibility (Mott et al., 2022). “Regardless of whether the youth is a member of 4-H, FFA or simply raising animals on their family’s farm or ranch, the valuable life skills developed from raising animal projects are numerous” (Martin & Rusk, 2021, pg. 64).

Educational activities, such as the care for animals, can offer tremendous help in developing applicable skills in youth with disabilities that can be utilized for future employment or community involvement (Randolph, 1998). Youth with disabilities may become involved with the activity of livestock shows through agricultural education as “most individual education plans submitted for special education requirements suggest vocational training for special needs students” (Davis et al., 2005, pg. 10). A case study regarding the perceived benefits a child with autism gained by participating in competitive livestock exhibitions concluded that the life skills of social relations, family involvement, and responsibility/knowledge and care of animals were obtained through participation (Davis et al., 2005). The study discusses the use of livestock shows for youth with disabilities who are lacking in social development to develop life skills (Davis et al., 2005).

Integrating youth with disabilities in agricultural programs “improves social acceptance, self-esteem, and social skills for all youth involved” (Brady & McKee, 2005, pg. 1). “All youth can benefit from the opportunity to become more aware of differences and more tolerant and accepting of others” (Brady & McKee, 2005, pg. 1). Providing inclusive opportunities for youth with disabilities to participate in mainstream shows with nondisabled peers creates environments where all individuals feel welcome, can access meaningful experiences, and pursue equal opportunities while building relationships (Stumpf et. al, 2002). There is a lack of literature regarding the best practices to include youth with disabilities in mainstream livestock exhibitions, but many studies have showcased the benefits of integrating individuals with disabilities into programs with nondisabled peers (Sumner et. al., 2018; Brady and McKee, 2005; Stumpf-Downing et. al, 2004; Stumpf et. al, 2002). Livestock expositions that do offer special accommodations to exhibitors with disabilities may be difficult to obtain or get forgotten about due to shortage of staff or resources. Programs that are created by youth specifically for individuals with disabilities may only occur for a year or two before the member graduates and the program is disbanded due to lack of interest or leadership. Providing support of equal access to all levels of ability demonstrates acceptance of disability and enables equity of resources to provide the opportunity for the individual to participate at their own level of independence (Stumpf et. al. 2002).

Conceptual Framework

The conceptual framework for this study was formulated utilizing LaVergne's Diversity Inclusion Program Model. The Diversity Inclusion Program Model highlights the three themes of inclusion, multicultural education, and culturally responsive teaching that must be met by youth development professionals to obtain diversity inclusion within their program. LaVergne describes diversity inclusion as an educational philosophy that welcomes all learners regardless of race, ethnicity, or exceptionality (LaVergne, 2008). By meeting the three themes displayed in LaVergne’s Diversity Inclusion Program Model, youth development professionals can formulate an inclusive educational culture within an educational environment. While this framework is formatted around classroom culture, it is applicable to non-formal educational programs as well (LaVergne, 2008). To allow for diversity inclusion in livestock exhibition, youth development professionals must be properly prepared and have access to resources to implement an inclusive

environment. LaVergne's Diversity Inclusion Program Model has been utilized in studies regarding perceptions of agricultural education teachers on diversity inclusion (LaVergne, 2008), 4-H youth professionals on diversity inclusion within 4-H (LaVergne, 2013), and identifying strategies for diversity inclusion in agricultural education programs (LaVergne et al., 2012). The Diversity Inclusion Program Model was chosen for this study due to its display of intertwining philosophical foundations to create diversity inclusion in educational programs and its relevance to the demographic shift among youth in society.

Purpose and Research Questions

The purpose of this collective case study is to understand and describe the individual lived experiences of participants in a disability inclusive livestock show and perceived best practices of livestock expositions that are constructed with diversity inclusion towards youth with disabilities. The research questions used to guide this study were:

1. What are the experiences of participants with disabilities in the 2022 Champions Livestock Show?
2. What are the experiences of participants without disabilities in the 2022 Champions Livestock Show?
3. What are the Parents/Guardians of participants with disabilities perceptions towards disability inclusive livestock shows?
4. What are the perceived best practices for inclusive youth programming and events that involve youth with disabilities?

Methodology

This collective case study examined the lived experiences of participants and perceived best practices of livestock expositions that are constructed with diversity inclusion towards youth with disabilities. This research study was conducted with a disability interpretive lens through qualitative methodology to focus on disability not as a defect, but as a dimension of human differences (Creswell & Poth, 2018). The study was performed as a collective case study through observation analysis and in-depth interviews with the individuals who participated in the program. Prior experience and biases that potentially influenced my interpretation of the findings and the outcomes of the study were acknowledged to establish qualitative quality. The researcher complied with the federal guidelines to conduct ethical research with human research subjects by gaining approval to conduct this study through the Kansas State University Institutional Review Board.

Collective Case Study Approach

The investigation was conducted as a collective case study, where the researcher selects multiple case studies to illustrate the issue (Creswell & Poth, 2018). In a collective case study, "a case could include one-person, multiple people, or a whole organization" (Bhattacharya, 2017, pg. 110). The cases selected for a collective case study should be a representative of the issue under investigation and be a source rich in information (Bhattacharya, 2017). By producing reports on individual and multiple cases, the researcher can provide analytical insight on the similarities and differences between the individuals and groups in the collective case study (Bhattacharya, 2017). The collective case study method was utilized to explore four groups, or cases, with different roles in a disability inclusive livestock exhibition (Creswell & Poth, 2018).

Data Sources and Collection

The exposition examined was the Champions Livestock Show which is a disability inclusive goat show hosted through Special Olympics Kansas that took place at the 2022 Kansas State Fair. The show is separate from the mainstream show and pairs 4-H/FFA market goat exhibitors with Special Olympic Athletes to provide them an inclusive opportunity to exhibit a goat. The participants in this research study were grouped together based on their role in the program Coaches, Athletes, Parents/Guardians, and Adult Volunteers. Coaches were youth without disabilities that exhibited a goat at the Kansas State Fair and were paired with Athletes who were youth with disabilities participating in the Special Olympics program. Coaches, Athletes, Parents/Guardians, and Adult Volunteers were considered four separate groups bounded together by a shared experience. The researcher utilized purposeful maximal sampling, which selects “cases that show different perspectives on the problem, process, or event” (Creswell & Poth, 2018, pg. 100). Convenience sampling, selection of the “sample based on time, money, location, or availability of sites or respondents” (Merriam, 2009, pg. 79), was also enacted as individuals volunteered to participate in the study. Fifteen interviews were conducted with seven being Coaches, five being Athletes with their Parents/Guardians, and three being Adult Volunteers.

To collect data, the researcher conducted in-formal, semi-structured, open-ended interviews which ranged from 4 minutes to 34 minutes (Creswell & Poth, 2018), but due to the time constraint some interviews were in person at the event and others were conducted over Zoom at a later date. Observations were also conducted, as the researcher collected data in the role of nonparticipant or observer, “the researcher is an outsider of the group under study, watching and taking field notes from a distance. He or she can record data without direct involvement with activity or people” (Creswell & Poth, 2018, pg. 168). By observing as a nonparticipant, the researcher had access to many individuals and a wide array of information, but the level of information revealed during the study was controlled by the participants being investigated (Merriam, 1998). Interviews were based on eliciting personal experiences from individuals to establish an in-depth understanding through different perceptions and lived experiences of participants (Jones et. al, 2022). Observations were conducted to describe, interpret, and evaluate the program to produce thick and rich narrative descriptions to aid in understanding the experience under investigation (Creswell & Poth, 2018).

The interview questions were derived from LaVergne’s Diversity Inclusion Program Model (LaVergne, 2008). Interview protocol was reviewed by a panel of experts and piloted with graduate students at Kansas State University. The panel of experts and student pilot group suggested rewording of questions so the study’s participants would better understand. Coaches and Adult Volunteers were interviewed individually, while Athletes and their Parents/Guardians were interviewed together. The in-person interviews were audio recorded on a secure laptop and the Zoom interviews were video recorded on a password protected account.

Data Analysis and Interpretation

Phenomenological data analysis methodology was used as a guide to describe personal experiences through significant statements (Creswell & Poth, 2018). To formulate results, the researcher analyzed the individual transcripts by manually conducting initial coding to form major categories from the data (Saldaña, 2021). Initial coding with notes and analytic memos was used to produce overarching ideas, reflections, and general categories. Transcripts were

analyzed and a code book was created in preparation of axial coding which “describes a category’s properties and dimensions and explores how the categories and subcategories relate to each other” (Saldaña, 2021, pg. 361). Theoretical coding was then applied to progress “toward discovering the central/core category that identifies the primary theme or major conflict, obstacle, problem, issue, or concern to participants” (Saldaña, 2021, pg. 369).

After the completion of coding, constant comparative analysis was performed. “The constant comparative method involves comparing one segment of data with another to determine similarities and differences. Data are grouped together on similar dimensions. The overall object of this analysis is to identify patterns in the data” (Merriam, 2009, pg. 30). Cross-case analysis was used to provide thematic analysis across all cases along with assertions or interpretations of meanings from the cases (Creswell & Poth, 2018). Coding was conducted solely by the researcher and then revised by a second coder to ensure validity and reliability.

Qualitative Quality

Qualitative quality was established through utilization of Tracy’s (2010) Eight “Big-Tent” Criteria for Excellent Qualitative Research. A worthy topic was established through the relevance, significance, and interest of disability inclusion in the livestock industry due to an increase in disability within the population and including those individuals in mainstream programs (Tracy, 2010). Rich rigor and meaningful coherence were achieved through purposeful data collection and analysis procedures to ensure the results aligned with the research objectives and intended purpose of the study (Tracy, 2010). Trustworthiness was established through sincerity and credibility which were met through maintaining self-reflexivity throughout the study, subjectivity statement regarding potential bias, and the use of thick, rich descriptions (Tracy, 2010). Trustworthiness was further enhanced as credibility was also established through prolonged engagement and triangulation by analyzing two types of data collected, interview transcripts and observation analysis field notes (Tracy, 2010). Resonance was attained by ensuring transferability and writing methods used throughout the investigation to convey meaning to the reader (Tracy, 2010). The application of the “Big-Tent” criteria demonstrated the efforts put forth by the researcher to produce a qualitative study that exemplified integrity and quality.

Findings

Description of Participants

The participants of the fifteen interviews consisted of seven Coaches, five Athletes, five Parents which included one guardian who indicated they were not the parent of the Athlete they attended with but has been labeled a parent for confidentiality, and three Adult Volunteers (see Table 1). Some participants had previously been involved in the program before agreeing to participate in this study. The 20 individuals were selected for this collective case study as they presented multiple cases to show different perspectives on the program, various lived experiences, and personal encounters with disability inclusivity.

Table 1

Demographics of Participants (n=20)

Pseudonym	Gender	Age	Ability Status
Coach 1	Male	14	Nondisabled

Coach 2	Female	12	Nondisabled
Coach 3	Female	16	Nondisabled
Coach 4	Male	13	Nondisabled
Coach 5	Female	16	Nondisabled
Coach 6	Male	18	Nondisabled
Coach 7	Female	17	Nondisabled
Athlete 1	Male	11	Disabled
Athlete 2	Female	18	Disabled
Athlete 3	Male	11	Disabled
Athlete 4	Male	14	Disabled
Athlete 5	Male	16	Disabled
Parent 1	Female		Nondisabled
Parent 2	Female		Nondisabled
Parent 3	Female		Nondisabled
Parent 4	Female		Nondisabled
Parent 5	Female		Nondisabled
Adult Volunteer 1	Female		Nondisabled
Adult Volunteer 2	Male		Disabled
Adult Volunteer 3	Female		Nondisabled

RQ1: What were the experiences of participants with disabilities in the 2022 Champions Livestock Show?

Athletes and Parents/Guardians were asked to indicate the Athlete’s involvement in agricultural experiences. All but one Athlete had been exposed to an agricultural experience through family farming, FFA or 4-H involvement, or simply by interacting with animals on a relative or neighbor’s farm. Athlete 3 seemed to be the most active in agriculture as he stated he was a member of 4-H, which Parent 3 followed by stating “we show swine and dairy cattle already. We’re a big 4-H family.” Parent 1 shared Athlete 1 “really loves animals, and we have goats” and their family has a farm where Athlete 1 has been exposed to agriculture, but they had never participated in a livestock competition outside of the Champions Livestock Show. Parent 4 stated Athlete 4 had “went to his teacher’s house in fifth grade, and she had goats” and because of that experience she shared “the teacher had asked him what he wanted to be when he grew up. And he said, farmer.”

Adult Volunteer 1, who has been influential since the start of the Champions Livestock Show, expressed that her Athlete grew up participating in activities on the family farm by stating “We raise cattle. So, he participates in that.” Adult Volunteer 1 discussed her Athlete’s participation in caring for their other children’s show animals by expressing “he[‘s] walked all the animals that have won, we won state fair before, in the goat show and he’s walked all those animals. He’s fed all those animals. He’s worked hard, but he never got to show one.” Through this exposure to agriculture and the livestock industry, Adult Volunteer 1 sought out the Champions Livestock Show to provide an opportunity for her Athlete to participate in exhibiting livestock. The responses collected from her showed her Athlete gained independence and social adeptness from participating in the show and he has come away with more life skills every year he participates.

Athletes and Parents/Guardians were asked what life skills they felt were gained by participating in the Champions Livestock Show which many responded with communication and social skills. Parent 1 stated the biggest attribute her Athlete gained was “Social skills cause any time he can work with a peer, um, and talk, just even just talking that’s a really big deal... anytime he gets a chance to do that, to have whole conversations.”

Athlete 1 followed this by sharing his Coach and him “were actually talking a lot” and had good conversation throughout the duration of the program. Parent 2 expressed communication was the largest takeaway for her Athlete, stating “being able to take direction from somebody I think is very important” which was followed by Athlete 2 stating “[Coach 3] helped...had easy instructions.” When asked what the greatest gain her Athlete obtained from participating in the program, Parent 3 responded “the social aspect, um, the life skills just...being, um, in a large crowd, learning the social interaction, eye contact, communication, shaking hands, all life skills.”

Parent 2 and Athlete 2 had a unique relationship with their Coach, as she had been Athlete 2’s Coach the year prior. When asked about her Coach, she stated “I had her last time”, Parent 2 explained “the girl that we had last year, stopped [Athlete 2] and approached her and then so they, they, she goes do you want to do it again with me this year and she was like, yeah, absolutely. So, like I said a friendship was formed.” Parent 3 discussed the relationships that Athlete 3 has built through this program has allowed him to recognize familiar faces at other events, stating “the experience, the friendships, the connections that he’s making when we go to other events, he sees familiar faces.” Parent 5 and Athlete 5 explained that he exchanged numbers with his Coach and were invited to attend other shows with the Coach where “if he went up and showed or something we can just, he could go up and just hang out and do something with him.” She expressed that Athlete 5 met her outside the show ring exclaiming “I’ve made a friend! I made a friend!” It was observed that the Athletes were welcomed with open arms by the Coaches who made their best attempt to create a comfortable environment and form a relationship. This created a sense of belonging for the Athletes to engage in exhibiting the goat while also expressing their self.

Athlete 3 and Parent 3 felt the Champions Livestock Show was an opportunity “to get more people in 4-H.” Parent 1 stated that after seeing her Athlete participate, she was “trying to find ways to get him involved in 4-H” as she felt this opportunity was extremely beneficial for him. Parent 5 responded that this was an opportunity where “[Athlete 5] got to do is some things that a lot of kids don’t” and this experience really opened him up to the possibility of becoming more involved in agriculture programs. Parent 4 stated they were looking for ways to expand Athlete 4’s experiences, stating “we want to just push him and help him. I figured showing the goat would be a good start.”

Four of the five Athletes indicated they would want to participate in the Champions Livestock Show in the future. Athlete 1 was the only Athlete to state he did not want to participate again, but Parent 1 expressed that he did have a good time and was just being stubborn with his answers. Athlete 2 did not show much emotion during the interview, but when asked if she would like to participate again, she eagerly exclaimed “Yeah!” and showed signs of excitement and joy. Parent 2 explained Athlete 2 participated in the program previously and “she was basically pretty, uh...insistent she was doing it again.”

RQ2: What were the experiences of participants without disabilities in the 2022 Champions Livestock Show?

The responses from the seven Coaches interviewed for this study were interpreted as being positive and the program having significant impact on their lives. Six out of the seven Coaches interviewed expressed they had been exposed to disability before participating in this program and therefore already had experience with interacting with individuals with disabilities. Coach 6 and Coach 7 shared they had been exposed to disability through family members with Coach 6 stating, “I’ve always had family members with disabilities and everything like that. So, like I had prior knowledge, but I didn’t know everything about them” and Coach 7 sharing, “I’ve always kind of grown up, um, around special needs people.” The four other Coaches discussed being involved in school programs that allowed them to interact with individuals with disabilities. Coach 1 shared “I tutored a third grader that had a learning disability.”

Coach 3 indicated she had not been exposed to disability before participating in the Champions Livestock Show. She shared “in my small town, I didn’t know of anyone that was, um, had special needs” and explained that she was very nervous when she began participating in the Champions Livestock Show by stating “I felt that it was hard to make connections with those who maybe are different than myself. And I was always scared to go up to someone with special needs.” Coach 3 shared through the exposure she had to disability through the Champions Livestock Show, she felt she had the confidence to seek out other opportunities. She stated, “That self confidence that you build every year that you do this experience... as I see more people with special needs, I have the confidence to kinda go up to them, talk to them.”

The seven Coaches were all observed displaying disability inclusion through participating in the Champions livestock show and then continuing to interact with their Athletes after the conclusion of the show. Coach 6 stated “I feel like all the Athletes and especially the Athletes’ parents, they get, they get more out of it than what we do. Because they’re getting to experience something that they don’t ever like, get to see.” The Coaches indicated through their involvement in programs with diverse individuals they viewed individuals with disabilities no different from others. Coach 7 discussed disability acceptance by stating

I think that because they have to walk in the same walk that we do every single day, but they have to find different ways to do it because of how God made them. And it’s just so amazing to me that most of them are so happy and so full of life, no matter what they’re going through like they always have a smile on their face.

Coach 6 also discussed that while individuals with disabilities may face challenges, they also have their strengths too and their disabilities do not hinder their right to participate in mainstream programs. It was observed by the researcher that throughout the duration of the show the announcers continuously educated the public about the concept of the program and promoted disability education and acceptance to the spectators.

Coaches expressed that participation in the Champions Livestock Show had provided sincere significance in their lives and was a meaningful experience. Coach 6 explained participation in the show was “probably one of the best experiences I’ve had in livestock showing” and the significance of this program changed his perspective by stating “I learned that perfection doesn’t always happen and sometimes, instead of being perfect, it’s more about the experience and the interaction with the Athletes than it is about being the grand champion.”

When asked if her participation in the program was meaningful, Coach 7 stated “[This is] one of the most humbling and rewarding experiences that I have ever been through, and I would do it a thousand times over again if I had the chance.” The significant impact the program had on the participant’s lives is displayed through their responses which showcase how meaningful this experience was to them. The researcher observed a display of emotions throughout the show and how many parents expressed joy for their Athlete or Coach to have the opportunity to participate. Many Coaches were observed to be displaying positive emotions and expressing how meaningful the show was to them through continuation of interacting with their Athlete after the conclusion of the show.

RQ3: What were the Parents/Guardians of participants with disabilities perceptions towards disability inclusive livestock shows?

Adult Volunteer 1 shared her perceptions towards disability inclusive livestock shows as being able to provide her Athlete “a chance for him to be seen in a...capacity as other kids are seen.” She felt that programs like the Champions Livestock Show gave Athletes the opportunity to participate with nondisabled peers on a level playing field. A chance to be seen as a typical participant while showcasing acceptance of diversity. Adult Volunteer 3 echoed this when she spoke about disability being “different, not less” and it was observed Adult Volunteer 3 spoke directly to the Athletes rather than the Coaches. Each Athlete was addressed by Adult Volunteer 3 multiple times to provide them a chance to interact and communicate about their animal.

In the Athlete and Parent/Guardian interviews, the researcher asked how disability inclusion was promoted through the show. Parent 3 stated “They welcomed anyone and everyone no matter the ability” and Parent 1 shared “I saw a lot of people with different abilities that were participating and having a great time.” When asked how the show displayed disability inclusion, Parent 5 stated “they made sure that they felt like that they honored that they were equal” as every Athlete had the opportunity to exhibit a goat and have the same amount of time to be mentored by their Coach and learn about their animal. Disability exposure was discussed as a positive by the Parents/Guardians. Parent 3 expressed disability exposure “creates that...atmosphere, that relationship of someone who maybe hasn’t grown up with a special needs person in their life” as “even though the Athletes are learning, the Coaches are learning just as much if not more.” Parent 1 discussed how programs like the Champions Livestock Show bring awareness to the need for inclusion and stated “it’s not only good for the kids but I’m a big proponent for it being good for the community” as it is displaying acceptance and educating spectators on the topic of disability. She also stated; “I think the more we do that and make it normal, you know, the better off it is.”

The Parents/Guardians were asked if the program provided equitable opportunities for their Athletes to participate in which many responded how Adult Volunteer 3 exhibited equity in the show ring. Parent 2 responded how Adult Volunteer 3 was “looking at the Athlete to see what they were...so seeing, hearing that and that she was looking at...that was kind of, that was...comforting to me.” Parent 3 discussed how Adult Volunteer 3 was asking different questions to every kid and not trying to ask them all the same thing to compare. Um, so there was a couple of nonverbal Athletes that were close to him, and she was asking yes or no questions.

Parent 3 also explained “When [Adult Volunteer 3] asked [Athlete 3] questions, she was asking a little bit more difficult when she realized that, you know, he could communicate.”

Parents/Guardians expressed the program was meaningful for them to be able to witness their Athletes be involved in a unique program that provided them a chance to step out of their comfort zones and develop life skills. Adult Volunteer 1 explained for her Athlete, this experience was “everything it was supposed to be because he got to show an animal at the state fair” and “a moment of time for him to be excited and have fun...on his own level.” Parent 2 explained how beneficial this experience was for her Athlete and how “this is something that I wish my other kids could do.” Adult Volunteer 1 also shared she felt her Athlete’s participation in the program provided him a sense of belonging as he was able to build relationships with others who shared a passion for exhibiting livestock.

RQ4: What were the perceived best practices for inclusive youth programing and events that involve youth with disabilities?

When asked how the program could improve Coach 6 stated “I think the way to improve it is to open up to other species” and Coach 7 echoed this by saying “implementing like the main five species, maybe horses if that was a possibility, um...pigs, sheep, and cattle and I mean, goats. I think that all of those five species would be really cool to implement into this program.” Coach 1 suggested “do it on rotation for animals like goats one year, then sheep and just switch on and off that way people if they come back it’s not the same animal, they get to do something else too.” This suggestion would also allow for exhibitors from other species to have the opportunity to serve as Coaches in the Champions Livestock Show and build relationships with individuals with disabilities to become more aware and inclusive.

The desire to expand the program to other species was supported by the Athletes and Parents/Guardians. When asked how he would improve the program, Athlete 5 exclaimed “Bring more animals in!” which was followed by Parent 5 stating “I think it would be really good to understand the other species” and “I would encourage to do some other animals.” The feeling was mutual between Parents/Guardians with Parent 1 stating “We need more of this” and Parent 4 suggesting “different species” being a neat opportunity for her Athlete to encounter. Parent 2 proposed “not just do Special Olympics but maybe even go into the classrooms of the schools” to recruit more Athletes for the program and spread awareness of how individuals can get involved. Adult Volunteer 2 and Adult Volunteer 3 all expressed their desire to expand the program to other barns at the State Fair.

Adult Volunteer 2’s experiences of exhibiting livestock with a disability before inclusive practices were implemented was displayed through insight he provided on obstacles he had to overcome to be able to exhibit his animals while also showcasing adaptations and accommodations made to help him be successful. He described that a waiver had been required for him to participate to ensure if his safety was put at risk, the livestock show would not be sued. He spoke about how some shows were more accessible than others depending on the waiver’s requirements. He explained “I could show...basically proof of the work that I put on at home and, and then so you know, then we get a special waiver sort of thing to, to get, to get in the ring.” When asked to elaborate on the accessibility the show provided, he explained “there

wasn't really a... spelled out process and how to do it... you just kind of had to figure some of that out as you went along.”

Much of Adult Volunteer 2’s interview focused on the adaptations made during his time as an exhibitor to be successful in the show ring. He stated “we always kind of had to adjust and adapt, you know, a little bit as I showed” to meet his needs to efficiently exhibit alongside others. When asked about the accommodations his family made, he explained “we always had to make some adjustments to my walker”, his physical show stick was a “wooden shepherds’ cane with a crook”, “my show stick carrier was an old rifle scabbard”, and “bigger wheels” on his wheelchair. When asked about the accommodations the show provided him, he explained “they would kind of put me, you know, towards the end of the class...try to limit...the potential of a wreck” and the show would “have one extra ring person there to kind of be my quote unquote bodyguard in case something goes haywire.” It was concluded accommodations to be implemented into other programs include extra help in the show ring, liability waivers in case of injury, allowing an assistant to accompany the showman in the ring, adaptations to carry show sticks or lead animals, and rearrangement of the lineup of the class to prevent animals from being startled. Collectively, all participants shared positive experiences with minor suggestions for the Champions Livestock Show and expressed interest in future involvement in this program and others.

Conclusion

The livestock industry has seen a continuous increase in the number of youths with disabilities participating in livestock show over the years (Martin & Rusk, 2021). With this increase, the need for disability inclusion is critical to provide youth the opportunity to develop applicable skills that can be utilized for future employment or community involvement (Randolph, 1998). The livestock showing can provide different layers of developmental skills to youth with disabilities while also giving them the opportunity to build relationships with peers (Durian & Fowler, 2020). Ensuring the components of inclusion, multicultural education, and culturally responsive teaching are met in youth livestock exhibitions can formulate an educational environment that is structured to provide social equity and equitable education to all students regardless of race, ethnicity, language, social class, physical, or mental abilities (LaVergne, 2008).

Based on the lived experiences of participants in the disability inclusive livestock show, participants are gaining experience with diverse individuals and forming an understanding of diversity amongst their peers. Diversity inclusion is being created through integration of individuals with disabilities into a program which showcases disability acceptance and education to the public. This program also offers individuals with disabilities the opportunity to care for an animal which builds the life skills of responsibility and consciousness of other’s needs (Davis et al., 2005). The results of this study showed participants obtained a positive experience from participating in the show and developed life skills while also gaining an understanding of equity in the show ring. Parents/Guardians viewed the program as being an opportunity for their Athlete to grow independently and form relationships with others they may not usually approach. Based on the feedback from participants, it is recommended disability inclusive livestock shows be expanded into other species at the Kansas Fair to increase opportunities for disability inclusion and further the experiences of participants into new ventures.

The act of including individuals with disabilities in livestock shows also creates a sense of belonging. Adult Volunteer 2 spoke about how exhibiting livestock alongside peers without disabilities made him feel good about himself and able to relate to others in a more meaningful way. Athletes who participated in the Champions Livestock Show were able to be viewed in the same capacity as other exhibitors, while also displaying disability inclusion and education to spectators. Programs like the Champions Livestock Show help break the mold of the typical livestock showman and bring awareness to the endless possibilities available to individuals with disabilities if they are given the chance to be included. It is recommended the results of this investigation be shared with other livestock show managers to grant them an understanding of inclusive practices and accommodations to offer or adaptations to make to increase accessibility as this program builds a structure of equity to be used in mainstream livestock exhibitions to increase inclusion.

For future research we recommend expanding the study to include participants of other disability inclusive livestock exhibitions. This will provide different perspectives and gain further insight on different practices implemented in each program to select the best ones to recommend to other youth development leaders for their programs. It is also recommended to further research other programs and the founding of their organization to understand the reasoning behind the program's establishment. Gathering data on how different programs have evolved to become more inclusive can provide guidelines for other youth programs to build up to disability inclusion through a step-by-step process. Finally, future research should entail disability awareness and inclusion trainings for youth development educators and how to provide them with the resources to obtain disability inclusion. Evaluating how established disability inclusive programs train their staff and volunteers may allow for detailed trainings that cover all areas of diversity inclusion in depth.

This study provides a foundation for including and integrating youth with disabilities in the livestock industry. While this research is based around an inclusive livestock show that is separate from the mainstream show, it can be used as a segway for integration of individuals with disabilities into mainstream livestock expositions to allow youth with disabilities the opportunity to attain the same experiences as others. Literature shows many individuals with disabilities struggle to participate in social life due to physical and communication barriers (United Nations, n.d.). By mainstreaming youth with disabilities into atypical livestock shows, we can enhance social life participation and create that sense of belonging mentioned by the study's participants. Although, some youth with more severe disabilities may benefit more from being included in shows exclusively for individuals with disabilities as specific accommodations can be made and the individuals' needs can be met more directly. To determine whether mainstreaming or inclusion would be the best possible choice for an individual with a disability, the concept of the least restrictive environment should be applied (Lynch, 2016). This study exemplifies the experiences and benefits gained by participants who are involved in programs that provide the opportunity to interact with diverse individuals and foster an atmosphere of acceptance. "Diversity inclusion mirrors a practical, human development approach to not only the educational wellbeing but also social wellbeing" (LaVergne, 2008, pg. 6). Understanding the benefits of disability inclusion and the experiences of individuals can progress the livestock industry to provide equitable opportunities to all.

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The Validation of the Preservice School-Based Agricultural Education Teacher Dispositions Instrument

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Effective teaching encapsulates professional, interpersonal, and intrapersonal knowledge. Likewise, dispositions influence educators' understanding of when and how to utilize knowledge and skills, especially in the context of their particular classrooms. While dispositions are a crucial piece of educator preparation program accreditation, neither InTASC nor CAEP provides a guide on which dispositions should be assessed. Without a valid and reliable instrument for SBAE educator preparation programs and limited research on dispositions in SBAE, further investigation is needed to provide teacher educators with tools to measure and implement dispositions to increase the growth of preservice agriculture teachers. This study was informed by the human capital theory, allowing the researchers to validate the preservice SBAE teacher dispositions instrument through a principal component analysis (PCA). The PCA fit to five components resulting in 18 of the 28 items loading above a 0.6, which accounted for 59.6% of the explained variance and an overall Cronbach's alpha of 0.98. The resulting components included Empathetic and Considerate, Directed, Engaged and Attentive, Personal Integrity, and Emotional Maturity. To accomplish the essential human capital growth during the teacher preparation program and clinical teaching experience, modeling the components is pivotal in furthering the professional dispositions of SBAE teacher aspirants.

Introduction and Literature Review

Effective teaching is complex as it encapsulates professional, interpersonal, and intrapersonal knowledge (Schulte et al., 2005). Teacher effectiveness involves more than expertise; it also incorporates contextual dispositions such as enthusiasm, reflective practice, and positive relationships with students (Edwards & Edick, 2006). Likewise, dispositions influence educators' understanding of when and how to utilize knowledge and skills, especially in the context of their particular classrooms (Saltis et al., 2020). Moreover, teacher dispositions relate to teacher effectiveness, quality, and student achievement (Edwards & Edick, 2006; Flowers, 2006; Schulte et al., 2005).

The Interstate New Teacher Assessment and Support Consortium (InTASC) introduced teacher dispositions in the 1990s to evaluate how new teachers use knowledge and skills (Schussler et al., 2010). Dispositions evaluations are currently used as a requirement of accreditation for educator preparation programs by The Council for the Accreditation of Teacher Preparation (CAEP) (CAEP; 2022 *CAEP Standards - Council for the Accreditation of Educator Preparation*, 2022). According to CAEP and InTASC, dispositions are "the habits of professional action and moral commitments that underlie an educator's performance," (Council of Chief State School Officers, 2013, p. 6; *Glossary - Council for the Accreditation of Educator Preparation*, n.d.).

While dispositions are a crucial piece of educator preparation program accreditation, neither InTASC nor CAEP provides a guide on which dispositions should be assessed. Educator

preparation programs must identify and create measurements individually (Flowers, 2006; Saltis et al., 2020). According to CAEP, the lack of a list of dispositions allows programs to identify dispositions that align with their programs (Saltis et al., 2020). However, it is challenging to create valid and reliable measurements for dispositions because of the difficulty in measuring internal beliefs and human behavior (Flowers, 2006; Schulte et al., 2005), lack of clear definitions (Borko et al., 2007), and because programs are often recreating the wheel (Saltis et al., 2020). Additionally, Diez (2006) notes that disposition measurements are often disconnected from knowledge and performance, often focusing on what is easy to measure and enforcing a culture of compliance by screening teacher candidates instead of providing feedback for growth.

Preservice teachers enter programs with differing levels of the skills, knowledge, and dispositions needed to be effective educators. It is assumed they have different trajectories based on the social context and their individual experiences (Vagi et al., 2019). Dispositions are critical in educator preparation programs because it is not enough for teachers to have content and pedagogical knowledge; teachers need to know when to apply knowledge and skills in the classroom (Saltis et al., 2020; Schussler et al., 2010). Teachers must be self-aware of their attitudes and perceptions to enact the knowledge and skills needed as an educator. It is imperative that educator preparation programs assist teacher candidates in cultivating dispositions and self-awareness (Schussler et al., 2010).

Within school-based agricultural education (SBAE), the importance of dispositions is highlighted in a model for teacher preparation in agricultural education and the standards for SBAE teacher preparation programs (*Standards for School-Based Agricultural Education*, 2017; Whittington, 2005). Effective agriculture teachers are expected to teach, supervise work-based learning, advise student organizations (Talbert, 2014), and demonstrate personal dispositions such as being trustworthy, respectful, and empathetic (Eck et al., 2019). However, there is limited research on dispositions within SBAE. Thiel and Bachman (2021) reported cooperating and preservice mentor teachers expressed differing opinions regarding the importance of essential dispositions for preservice agriculture teachers (Bachman & Thiel, 2021) and an analysis of the dispositions assessments and policies of SBAE educator preparation programs in the north central region of the American Association of Agricultural Educators (AAAE) found inconsistencies in what dispositions were being assessed and by whom they were being evaluated (Thiel & Claflin, 2022).

Research highlights the importance of dispositions in teacher effectiveness and quality (Edwards & Edick, 2006; Flowers, 2006; Schulte et al., 2005) and recognizes the distinct role of agriculture teachers (Eck et al., 2019; Talbert, 2014). Presently, agricultural education educator preparation programs often utilize university-wide dispositions due to accreditation requirements (Thiel & Claflin, 2022). However, educator preparation programs are recommended to foster the development of preservice teacher dispositions (Schussler et al., 2010). Without a valid and reliable instrument for SBAE educator preparation programs and limited research, further investigation is needed to provide teacher educators in SBAE with tools to measure better and implement dispositions to increase the growth of preservice agriculture teachers.

Theoretical Framework

This study was informed by the human capital theory. Introduced by economists, the human capital theory posits that as people invest in themselves through education and training, their productivity also increases (Goldin, 2016). Furthermore, researchers utilizing human capital theory also seek to examine the effect of the investment in education and training on individuals (Nafukho et al., 2004; van Loo & Rocco, 2004). Situating human capital theory within agriculture teacher preparation, there are connections to both the development of knowledge and skills of the future educators (Eck et al., 2021), but also recognizing the traits that are needed to be employable (Knight & Yorke, 2003; Robinson & Baker, 2013). The human capital of agriculture teachers is partly developed within educator preparation programs (Eck et al., 2020) and undergirded by the given standards from InTASC and CAEP (Council for the Accreditation of Educator Preparation, 2022; Council of Chief State School Officers, 2013). It is crucial to focus on the context of SBAE because human capital is directly related to a profession (Lepak & Snell, 2002; Smith, 2010). Specifically, dispositions are a form of human capital necessary for agriculture teachers to be successful, therefore we sought to clarify which are essential dispositions for SBAE teachers.

Purpose and Objectives

The purpose of this study was to validate the preservice SBAE teacher dispositions instrument, as identified by Thiel and Claflin (2022). Two research questions guided this study:

1. Determine the essential components related to SBAE teacher dispositions, and
2. Establish the reliability of the specific components within the preservice SBAE teacher dispositions instrument.

Methods and Procedures

This study employed a non-experimental survey research design (Gay et al., 2012). The population of interest was current in-service SBAE teachers across the United States ($N = 13,349$; Foster et al., 2022). To reach this population of interest, two contact methods were implemented. The first method utilized a randomized sample of 750 SBAE teachers' email addresses provided by the National FFA Organization. To further expand upon this sample frame, four social media posts were made in the *Ag Education Discussion Lab* on Facebook. This additional instrument distribution was implemented to expand the potential nationwide sample to further validate the instrument. The preservice SBAE teacher dispositions instrument was distributed via email and Facebook post. The email and post both provided access to a Qualtrics survey link, which included the 84-item instrument.

The preservice SBAE teacher dispositions instrument was developed based on the findings of a regional content analysis (Thiel & Claflin, 2022), which aimed to identify the necessary dispositions in universities' preservice SBAE teacher preparation programs. The tailored design method was employed (Dillman et al., 2014) to help the research team overcome common threats to validity and reliability of survey research. This included optimizing the Qualtrics instrument for web and mobile device compatibility, using consistent layouts and verbiage, and allowing participants to move between pages or pause their response.

In addition to the 84-item preservice SBAE teacher dispositions instrument, personal and professional characteristics (i.e., gender, age, certification pathway, highest degree earned, years of experience, program size, and state) of the participants were collected. The study resulted in responses from 272 SBAE teachers nationwide. Of those responses, 160 were complete responses used for data analysis. Unfortunately, due to the nature of data collection (i.e., using email addresses and Facebook posts), the determination of an overall response rate was not possible. For the 750 random email addresses, 47 were returned undeliverable, and 116 were returned complete, resulting in a usable response rate of 16.5% for the email contacts. Forty-four complete responses were received via the social media posts on Facebook. The *Ag Education Discussion Lab*, where it was initially posted, had 13,800 members, but how many of those are currently SBAE teachers and are active on Facebook is unknown. The 160 participants spanned 40 states and one territory. Table 1 provides an overview of their personal and professional characteristics.

Table 1

*Personal and Professional Characteristics of SBAE Teacher Participants
(n = 160)*

Characteristic	<i>f</i>	%
Gender		
Male	61	38.2
Female	96	60.0
Prefer to not respond	3	1.8
Age		
21 to 30	68	42.5
31 to 40	21	13.1
41 to 50	42	26.3
51 to 60	16	10.0
61 or older	10	6.3
Prefer to not respond	3	1.9
Certification Pathway		
Traditionally Certified- Bachelor's Degree	116	72.5
Traditionally Certified- Master's Degree	15	9.4
Alternatively Certified	23	14.4
Emergency Certified	2	1.3
Not Certified	3	1.8
Prefer to not respond	1	0.6
Years of Experience		
First Year	16	10.0
2 to 10	66	25.0
11 to 20	40	16.3
21 to 30	26	11.2
31 or more	12	13.8

Characteristic	<i>f</i>	%
State Continued		
Alabama	2	1.2
Arizona	1	0.6
Arkansas	1	0.6
California	8	5.0
Colorado	1	0.6
Florida	4	2.5
Georgia	3	1.8
Idaho	1	0.6
Illinois	8	5.0
Indiana	3	1.8
Iowa	6	3.7
Kansas	3	1.8
Kentucky	2	1.2
Louisiana	1	0.6
Maryland	1	0.6
Michigan	2	1.2
Minnesota	5	3.1
Missouri	11	6.9
Montana	4	2.5
Nebraska	2	1.2
Nevada	1	0.6
New Jersey	2	1.2
New Mexico	2	1.2
New York	2	1.2
North Carolina	1	0.6
North Dakota	3	1.8
Ohio	8	5.0
Oklahoma	6	3.7
Oregon	2	1.2
Pennsylvania	7	4.4
Puerto Rico	1	0.6
South Carolina	2	1.2
South Dakota	2	1.2
Tennessee	1	0.6
Texas	25	15.6
Utah	1	0.6
Virginia	2	1.2
Washington	7	4.4
West Virginia	1	0.6
Wisconsin	7	4.4
Wyoming	2	1.2

Data Analysis

Principal component analysis (PCA) was used to address the first research question using SPSS Version 28. PCA was used to convert the items identified by Thiel and Claflin (2022) into a questionnaire to measure preservice SBAE teacher dispositions, while also reducing the number of items into related factors (Costello & Osborne, 2005; Field, 2018). A Varimax rotation was implemented within the PCA with the assumption that the 84-items were correlated based off the

development of the items (Abdi, 2003; Field, 2018). Kaiser-Meyer-Olkin (KMO) values of sampling adequacy were evaluated from the PCA output, with a minimum acceptable value of 0.6 (Cerny & Kaiser, 1977). Additionally, eigenvalues (greater than 1.0), parallel analysis (above parallel), and communalities (greater than 0.5) were assessed to determine the retention of components and items for the final instrument (O'Connor, 2000).

As threats to validity and reliability are regularly of concern in instrument development (Privitera, 2017), the study began with a valid list of 84-items developed by Thiel and Claflin (2022); therefore, the reduced instrument developed within this study resulted in a valid instrument related to essential SBAE teacher dispositions. The use of PCA furthers construct validity by helping to operationalize the items within the components (Privitera, 2017). The second research question aimed to address reliability of the validated instrument, focusing on the internal consistency of the resulting PCA items based on Cronbach's alpha levels (Privitera, 2017). Cronbach's alpha levels can range from zero to one, with any value at or above 0.7 being considered reliable (BrckaLorenz et al., 2013).

Results

Research Question 1: Determine the Essential Factors Related to SBAE Teacher Dispositions

The 84-item instrument (see Table 2) was analyzed using a PCA to determine the essential components related to SBAE teacher dispositions. Specifically, the PCA provided a reduction of items while developing factors to account for maximum variance.

Table 2

Categorized Dispositions of SBAE Teachers

Category	Identified Disposition	Item Number
Timeliness/Punctuality	I meet deadlines.	T_1
	I am on time for class/observations/meetings/etc.	T_2
Attendance	I am present for entire class/observations/etc.	A_1
Commitment to Students' Learning	I believe all students can learn.	CS_1
	I take responsibility for student learning.	CS_2
	I advocate for what students need to be successful.	CS_3
Diversity, Equity, and Inclusion	I embrace and celebrate diversity (i.e., ability, race, SES, culture, gender, etc.).	DEI_1
	I am able to recognize strengths in all students.	DEI_2
	I recognize my own biases.	DEI_3
	I seek to understand perspectives and differences.	DEI_4
	I am open to diverse ideas and opinions.	DEI_5
	I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.	DEI_6
Ability to Communicate	I listen.	AC_1
	I use appropriate verbal communication skills.	AC_2
	I use appropriate written communication skills.	AC_3

Category	Identified Disposition	Item Number
Ability to Communicate Continued	I use appropriate digital communication skills.	AC_4
	I use appropriate non-verbal communication skills.	AC_5
Genuine/Authentic	I am my authentic self.	G_1
	I am genuine in my words and actions.	G_2
	I am trusted to do the right thing.	G_3
Creative	I am inquisitive.	CR_1
	I initiate creative solutions to problems.	CR_2
	I am innovative.	CR_3
	I use unique classroom ideas/thinks outside the box.	CR_4
Positive attitude	I maintain a positive attitude.	P_1
Reliable/Responsible	I am responsive (responds to emails, etc.).	R_1
	I ask for help.	R_2
	I communicate absences.	R_3
	I am independent/take initiative/self-motivated/take action to solve problems.	R_4
	I am organized/maintain accurate records/complete quality work.	R_5
	I follow through on responsibilities.	R_6
	I manage time appropriately.	R_7
	I have a strong work ethic.	R_8
	I am task-oriented/sets goals.	R_9
Emotional Maturity	I am able to maintain emotional control.	EM_1
	I am patient.	EM_2
	I use self-disclosure appropriately.	EM_3
	I identify personal responsibility in conflict and problem situations.	EM_4
	I accept fair consequences.	EM_5
	I advocate for myself (communicates my needs).	EM_6
	I resolve conflicts/approach challenging conversations.	EM_7
	I am professional in my interactions.	EM_8
Collaborative	I am able to work with others.	C_1
	I am driven to collaborate (seeks input from others).	C_2
	I support the work of others.	C_3
	I build consensus within a group.	C_4
	I am helpful and service minded.	C_5
	I contribute to the group.	C_6
Commitment to the Profession	I am dedicated to teaching and learning.	CP_1
	I understand expectations and am willing to work to meet them.	CP_2
	I value knowledge and educational experiences.	CP_3
	I participate in professional development.	CP_4
	I advocate for the importance of my content area.	CP_5
Engaged and Attentive	I participate in meetings/class/observations/PLC.	E_1
	I show interest in class/observations.	E_2
Appearance and Attire	I meet the school dress code policies.	AA_1

Category	Identified Disposition	Item Number
Empathetic/Caring/ Compassionate/ Respectful	I am considerate of others.	EC_1
	I see and focus on the good in people.	EC_2
	I am able to understand others' feelings.	EC_3
	I am concerned for the well-being of others.	EC_4
	I make students feel valued.	EC_5
Relatable/Relationships	I build and maintain positive relationships.	RE_1
	I am able to build and maintain positive rapport.	RE_2
Integrity	I follow laws and regulations.	I_1
	I tell the truth.	I_2
	I display academic integrity.	I_3
	I maintain confidentiality.	I_4
	I adhere to the code of ethics.	I_5
Lifelong learner	I display a positive attitude toward learning.	LL_1
	I have a growth mindset.	LL_2
	I am focused on learning as an individual (vs. student learning or learning in general).	LL_3
Leadership	I empower others.	L_1
	I delegate appropriately.	L_2
	I have the ability to lead students.	L_3
	I hold students accountable.	L_4
Problem Solving	I assess situations from multiple perspectives (not cultural perspectives necessarily).	PS_1
	I see the big picture.	PS_2
	I take a systems-thinking approach to solving problems – I see how the parts of a system fit and work together.	PS_3
	I use systematic processes to solve problems (appropriate data, etc.).	PS_4
	I am strategic in the way I think and plan.	PS_5
Flexible	I am able to manage change.	F_1
	I am adaptable.	F_2
Reflective	I am receptive to feedback.	RF_1
	I am self-aware.	RF_2
Lifelong learner	I display a positive attitude toward learning.	LL_1
	I have a growth mindset.	LL_2
	I am focused on learning as an individual (vs. student learning or learning in general).	LL_3

The initial PCA resulted in 19 components with eigenvalues greater than 1.0 and an acceptable KMO measure of 0.87 (Cerny & Kaiser, 1977). The eigenvalues were compared to parallel analysis which indicated the need for only 18 components. The data were then analyzed using a PCA with Varimax rotation, fitting the 84-items to 18 components. Component loadings and communalities of the rotated matrix were evaluated to determine the retention of items. For items to be retained a component loading of 0.6 or greater on at least one component was set, resulting in the retention of 28-items. Those 28-items were then re-analyzed using an additional PCA to verify the number of components related to SBAE teacher dispositions. The analysis resulted in a

KMO value of 0.88 with items loading across eight components, five of which were above parallel analysis. Therefore, the 28-items were then analyzed using a PCA with Varimax rotation fit to five components. Table 3 displays the output from this final PCA analysis (i.e., component loadings and communalities).

Table 3

Retained PCA Communalities and Component Loadings (28 items, n = 160)

Items	Component					Communality
	1	2	3	4	5	
L_2					.623	.52
CP_4			.414			.44
L_4					.645	.55
CS_1	.387				.458	.44
EM_5				.350	.624	.68
LL_1	.402					.53
R_4		.627				.53
CR_4					.603	.65
G_2	.360			.628		.60
I_1		.311	.384			.50
E_2	.341		.740			.74
A_1			.832			.77
I_2				.766		.63
G_3				.742		.65
CP_5		.665				.52
PS_2	.363	.473				.50
AC_2	.403	.544				.59
R_7		.463	.339			.50
EC_4	.759					.69
EC_3	.665	.349				.64
PS_3	.470	.312				.46
EC_2	.734					.61
RE_2	.668	.403				.67
DEI_3	.662					.64
T_2		.420		.553		.62
R_8		.537		.374		.47
E_1	.341		.781			.81
DEI_6	.793					.72

Note. Factor loading below .300 are not displayed; Extraction values are based on communalities; Items with a strikethrough were not retained in the final solution.

The PCA fit to five components resulted in 18 of the 28 items loading above a 0.6 (see Table 3), which accounted for 59.6% of the explained variance. Table 4 outlines the five components and corresponding items.

Table 4*Retained Items and Emerging Components (18 items)*

Component Title	Item	Corresponding Item Description
1. Empathetic and Considerate	EC_4	I am concerned for the well-being of others.
	EC_3	I am able to understand others' feelings.
	EC_2	I see and focus on the good in people.
	RE_2	I am able to build and maintain positive rapport.
	DEI_3	I recognize my own biases.
	DEI_6	I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.
2. Directed	R_4	I am independent/take initiative/self-motivated/take action to solve problems.
	CP_5	I advocate for the importance of my content area.
3. Engaged and Attentive	E_2	I show interest in class/observations.
	A_1	I am present for entire class/observations/etc.
	E_1	I participate in meetings/class/observations/PLC.
4. Personal Integrity	G_2	I am genuine in my words and actions.
	I_2	I tell the truth.
	G_3	I am trusted to do the right thing.
5. Emotional Maturity	L_2	I delegate appropriately.
	L_4	I hold students accountable.
	EM_5	I accept fair consequences.
	CR_4	I use unique classroom ideas/thinks outside the box.

Note. Item numbers presented in this table will be used from this point forward.

Research Question 2: Establish the Reliability of the Specific Components within the Preservice SBAE Teacher Dispositions Instrument

The 18-item validated instrument resulted in an overall Cronbach's alpha of 0.98, which is considered to be acceptable (Nunnally, 1978). Additionally, the Cronbach's alpha coefficients were considered for each individual component. The *Empathetic and Considerate* component included six items and resulted in a Cronbach's alpha of 0.87. The second component, *Directed*, only has two items, which is often considered problematic and, according to Eisinga et al. (2013), reporting a Cronbach's alpha is meaningless. Nonetheless, the component resulted in a Cronbach's alpha of 0.56. *Engaged and Attentive* had a Cronbach's alpha of 0.87 across three items. The fourth component, *Personal Integrity*, included three items and resulted in a Cronbach's alpha of 0.75. The final component, *Emotional Maturity*, spanned four items and had a Cronbach's alpha of 0.70. Four of the five components resulted in an acceptable Cronbach's

alpha level (i.e., 0.70 or greater) according to Nunnally (1978). Although one component fell below the desired level, the two items are part of the complete 18-item instrument measuring SBAE teacher dispositions, and the removal of any items lowers the overall Cronbach's alpha coefficient. Therefore, all 18-items were retained as part of the validated and reliable instrument.

Conclusions, Implications, and Recommendations

Assessment of preservice teacher dispositions is required for accreditation of teacher preparation programs (Council for the Accreditation of Educator Preparation, 2022) and is important for the development of teachers (Council of Chief State School Officers, 2013). Yet, there is a lack of consistency in Ag Ed preservice dispositions assessments (Thiel & Claflin, 2022). The purpose of this study was to validate an instrument to be used with preservice SBAE teachers, as well as identify the essential components related to SBAE teacher dispositions. The hope was the resulting instrument could be used to comprehensively assess preservice SBAE teachers' dispositions reliably in practice.

The resulting valid instrument reduced the initial item pool from 84 items to 18 items and from 22 components to five components. The resulting components included Empathetic and Considerate, Directed, Engaged and Attentive, Personal Integrity, and Emotional Maturity. According to the results of the PCA, the initial pool of 84 items can now be assessed within these five components. This is further evidenced by evaluating the items within each factor. In comparing the initial components to the final components, none of the final components share any items from the initial components. This leads us to believe the PCA did accurately reduce the 84 items into the five final components. The much-shortened instrument greatly improves the scale's usefulness in practice as it reduces cognitive load and survey fatigue (DeVellis, 2017).

Because assessing preservice teacher dispositions is left to each institution, developing valid and reliable measurements for dispositions is difficult (Borko et al., 2007; Flowers, 2006; Saltis et al., 2020; Schulte et al., 2005). Further, addressing the nuances associated with preparing SBAE teachers further convolute dispositions assessments. The 18-item, valid, and reliable measure developed through this study can be shared with SBAE teacher education preparation programs and institutions which are unable to develop their own unique instrument for the assessment of preservice teacher dispositions.

Overwhelmingly participants deemed all 84-items as important on the six-point scale of agreement. Which, according to DeVellis (2017) a lack of variance in responses can be a cause for concern in scale development. DeVellis (2017) recommends item means fall around the midpoint to ensure adequate variance. The resulting item means in this study ranged from $M = 4.80$ to $M = 5.81$ on a six-point scale. However, this high level of agreeance is logical given the initial development of the instrument. Because the items in the instrument were inductively and deductively developed through a content analysis of current SBAE preservice dispositions instruments (Thiel & Claflin, 2022), the current inclusion of the items in preservice preparation supports the established importance of all items in the scale. Therefore, it is essential to consider the complete list of dispositions developed by Thiel and Claflin (2022) as part of an SBAE teacher preparation program. Although the complete 84-item list is valuable, perhaps SBAE teacher preparation faculty should consider the validated instrument spanning five components

as the primary areas of focus as they prepare SBAE teacher aspirants. Often these items are hard to teach, therefore it is essential that faculty, mentor teachers, and cooperating teachers model these essential professional dispositions.

Sample size and response rate were limiting factors within this study, as the total number of usable responses ($n = 160$) fell below the recommended 10:1 ration of responses to items (Comrey & Lee, 1992). Although this was of concern, the study had representation from 160 in-service SBAE teachers spanning 40 states and one territory with varying personal and professional characteristics, which resulted in acceptable KMO values for the PCA (Cerny & Kaiser, 1977) and Cronbach's alpha levels for the overall instrument reliability (BrckaLorenz et al., 2013). Therefore, it can be concluded that the instrument is valid (i.e., measures what it is intended to measure) and reliable (i.e., consistent and repeatable) following the recommendations of Privitera (2017). Ultimately, the development and validation of this instrument was established to further the human capital (i.e., education, skills, training, and experiences) development of preservice SBAE teachers.

As such, the *Preservice School-Based Agricultural Education Teacher Dispositions Instrument* is situated within human capital theory, connecting to both the development of knowledge and skills of SBAE teacher aspirants (Eck et al., 2021) and the essential employability skills within the profession (Knight & Yorke, 2003; Robinson & Baker, 2013). Implementing this instrument through modeling behaviors, cooperating/mentor teacher selection, and preservice teacher self-evaluation will allow teacher preparation programs to make essential connections to InTASC and CAEP standards as part of their credentialing (Council for the Accreditation of Educator Preparation, 2022; Council of Chief State School Officers, 2013). To accomplish the essential human capital growth during the teacher preparation program and clinical teaching experience, modeling of the 18-items across the five components is pivotal in furthering the professional dispositions (i.e., Empathetic and Considerate, Directed, Engaged and Attentive, Personal Integrity, and Emotional Maturity) of SBAE teacher aspirants.

To strengthen the validity and reliability of the scale and following the guidelines of Osborne and Fitzpatrick (2012), we recommend replicating this study with preservice teachers, re-running the PCA, and comparing the results of the two samples. Strong replicability would provide additional confidence in the components as extracted, as well as the likelihood the scale would behave similarly in other populations. As we work to narrow the focus of this instrument to preservice SBAE teachers, validating the scale to that population is critical.

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Using Audience Segmentation to Identify Target Audiences for Climate-Smart Beef Production Communication

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Abstract

In the face of increasing consumer scrutiny of the food supply chain, communication practitioners have been determined to understand public perceptions of the food production process from “farm to fork.” The beef industry has been of particular interest due to the relatively high production emissions of beef production and an increased level of public support for environmentally friendly food behaviors, such as eating less beef. With the emergence of climate-smart beef production techniques, however, little is known about the public’s perceptions of climate-smart beef production practices and products. This study identified and described unique target audiences for educational communication about climate-smart beef production using audience segmentation. Through a K-means cluster analysis, we identified four strategic target audiences based on respondents’ climate change concern, political ideology, trust in science, and perception of environmental responsibility of the beef industry. We then described each cluster’s beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics. This study provides insight and recommendations for educators and other practitioners communicating about climate-smart beef as well as areas of future research into this emergent area.

Introduction

In the face of increasing consumer scrutiny of the food supply chain, communication practitioners have been determined to understand public perceptions of the food production process from ‘farm to fork’ (Nukala et al., 2016). Previous scholars in agricultural education and communications have examined consumer perceptions of the food supply chain, including poultry production (Estes et al., 2015; Powers et al., 2020), animal slaughter (Tarpley et al., 2020), locally produced beef products (Oesterreicher et al., 2018), local strawberries (Ruth & Rumble, 2016), and local food messages (Abrams and Soukup, 2017). Notably, the beef sector has been of particular interest to consumers due to the environmental impact of animal agriculture production (USDA, 2022c) and the current public interest in environmentally friendly behavior (Nemes et al., 2021). In fact, both during and after the COVID-19 pandemic, consumer trends indicated an increase in purchases of products with labels deeming the product “sustainable” (Nemes et al., 2021). While beef is the most resource-intensive agricultural sector, agricultural production accounts for only 11.2% of all domestic greenhouse gas emissions (USDA, 2022c). The beef industry states it only contributes to 2% of these domestic greenhouse gas emissions (NCBA, 2022), and this sector continues to work toward reducing its environmental impact. The American beef industry also stated it has lowered its contributions to climate change by 30% from 1975-2017, with production greenhouse gas emissions 10 to 50

times lower than global peers (NCBA, 2022). On farm practices such as managed or rotational grazing, increased feed efficiency, reforestation, reduced use of farm machinery, and other efforts have contributed to these gains in efficiency (de Souza et al., 2017; Gosnell et al., 2020; Mishra et al., 2018).

The federal government has also prioritized and incentivized the climate-smart food production movement. In 2022, the USDA launched a Partnership for Climate-Smart Commodities Initiative to “expand markets for America’s climate-smart commodities, leverage the greenhouse gas benefits of climate-smart commodity production, and provide direct, meaningful benefits to production agriculture, including for small and underserved producers” (USDA, 2022b, para. 1). The initiative invested more than \$3.1 billion for 141 agricultural projects. Vytelle, a company which helps producers refine more sustainable beef genetics, was awarded \$10 million of the original sum to help reduce the beef industry’s emissions by 50% via technology and genetic selection (Vytelle, 2022). Another recipient of \$10 million, Sustainable Northwest, has partnered with Grazewell, an initiative of 100+ western ranchers, to adopt regenerative ranching practices to “be part of the climate solution” (KTVZ, 2022, para. 2).

The novelty of these practices, beef’s relatively high production emissions, and subsequent media coverage have catalyzed the public to consider lowering red meat consumption as an option to lower their individual carbon footprint. Happer and Wellesley (2019) reviewed research in the UK, US, China, and Brazil to understand media’s role in public perception of meat consumption and acknowledged an increase in social campaigns intended to reduce meat consumption for the sake of reducing climate change. Sanchez-Sabate and Sabate (2019) systematically reviewed 34 papers on consumer perceptions of meat consumption in the context of environmental stewardship and found that consumers are generally aware of meat’s environmental impact and willing to reduce meat consumption for the sake of the environment. In the public press, the Scientific American published an article titled *Eating Less Red Meat Is Something Individuals Can Do to Help the Climate Crisis* (Oreskes, 2022). Other news coverage featured the 2019 International Panel on Climate Change (IPCC) report that included a recommendation to reduce meat consumption, such as a Nature article titled, *Eat less meat: UN climate-change report calls for change to human diet* (Schiermeier, 2019). Telg et al. (2018) suggested the beef industry has received a “black eye” from the public in this regard. The beef industry is understandably concerned about the public’s perception of its products and processes and what this might mean for the economic viability of the industry. In fact, the USDA already reported an expected “modest decrease in meat consumption for 2022” (USDA, 2022a, pp. 1).

As a reaction to both climate change and public perception, Cusworth et al. (2021) acknowledged a “green rebranding of cattle” (p. 1). This “rebranding” attempts to educate the public about sustainable agricultural practices and foster a positive attitude of the industry among environmentally conscious consumers and the general public. In line with this mission, scholarship and practice have documented the importance of understanding who is in the audience and abandoning blanket messaging to deliver unique messages tailored to target audiences of similar individuals (Grunig, 1989). For example, within the *Journal of Agricultural Education*, several studies have investigated audience characteristics of water conservation

messages to develop tailored, strategic messaging to its publics (Fischer et al., 2018; Huang et al., 2016; Warner et al., 2015; Warner et al., 2017). Other research has described the need for advanced quantitative analysis of audience characteristics beyond demographic information (e.g., behavioral characteristics, motivations, issue perceptions) for environmental and scientific communication, such as hierarchical k-means cluster analysis (Hine et al., 2014), which has seen limited use in our discipline (Essary et al., 2021). Our study addresses this gap as well as the National AAAE Research Agenda's priorities one (Public and Policy Maker Understanding of Agriculture and Natural Resources), two (New Technologies, Practices, and Products Adoption Decisions), and seven (Addressing Complex Problems: Climate Change) (Roberts et al., 2016). This study sought to identify and describe unique target audiences for educational and other strategic communication about climate-smart beef production using audience segmentation.

Conceptual Framework

Audience Segmentation

Audience segmentation has been identified as an essential tool in the strategic communicator's toolbox, building upon the understanding that knowing your audience is crucial to developing compelling communication. Warner et al. (2016) emphasized the importance of applying a "social marketing" framework to Extension programming, starting with "identifying the target audience and selecting specific behaviors to influence" (p. 15). Identifying target audiences through audience segmentation allows for tailored communication to unique subgroups that share similar characteristics (Warner et al., 2016). Scholarship has shown that communication tailored to individual's current perceptions (e.g., values, political ideology, behaviors, beliefs, and other worldviews) can be more compelling (Grunig, 1989).

When developing climate-related messages, considering audience members current perceptions is essential due to the highly polarized nature of climate change in the United States (McCright et al., 2016). Many communication efforts and studies have used audience segmentation to identify target audiences for climate change related messages with goals to encourage perception and behavior change, such as supporting climate change mitigation policy and other environmentally sustainable practices (Bostrom et al., 2013; Detenber et al., 2016; Hine et al., 2014; Maibach et al., 2009). Due to the recent emergence of climate-smart beef production practices, no research has applied audience segmentation techniques to the general public to identify target audiences for climate-smart beef communication. The following variables have been identified in the literature as related or relevant to other climate-friendly behaviors and were used to form the target audience segments.

Political Ideology

Climate change perceptions in the United States have been found to be closely related to an individual's political ideology, with those who identify as Republican tending to be more skeptical of climate change science (Arbuckle, 2016; de Leon et al., 2020; Merkley & Stecula, 2021) and at risk of adverse message effects when receiving climate change messages (Chinn & Hart, 2021). A Pew Research study found that even though Republicans considered climate change a lower priority issue, they most highly favored the climate-friendly action of planting

trees to absorb carbon emissions (Tyson, 2021). Other research has shown that political ideology is related to willingness to support climate change mitigation policy (McCright et al., 2016).

Climate Change Concern

The way an individual perceives climate change, including how much it worries or concerns them (Bouman et al., 2020; Maibach et al., 2009; McCright, 2009) and how risky they perceive it (Dietz et al., 2009), has been shown to be positively correlated with their likelihood to behave in a climate-friendly way or adopt a climate-smart behavior. In this case, the behavior is purchasing climate-smart beef, therefore posing climate change concern as a relevant variable to this behavior for some audience segments.

Trust in Science

An individual's level of trust in science has been found to be closely related to climate change perceptions and receptiveness to messaging related to climate-friendly behaviors (Cologna & Siegrist, 2022). Because individuals are unlikely to themselves be climate scientists, they must trust the scientific consensus (i.e., climate change is real and primarily human caused) and processes that preceded it. While trust in science has been unexplored in the context of climate-smart beef production, it has been found as a key variable of influence in other environmental behaviors, including general meat consumption (Happer & Wellesley, 2019), reducing energy use, and donating money to environmental groups (Taniguchi & Marshall, 2018).

Environmental Responsibility

Another variable closely connected to an individual's likelihood to purchase climate-smart beef is their perception of the responsibility the beef industry has to environmental stewardship. Burnier et al. (2021) measured environmental responsibility in a study of Brazilian consumers perceptions of sustainable beef production processes to find this perception relevant to consumer decision making. Gosnell et al. (2021) documented U.S. beef industry leader's perceptions of the industry's social sustainability, including environmental factors. Other more generalized studies have found that an individual's level of environmental concern influences pro-environmental behavior (Tam & Chan, 2018).

Describing the Segments' other Relevant Characteristics

In addition to the aforementioned variables used to form the audience segments (discussed in detail in the methods section), we also describe other relevant characteristics of the audience members, including their beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics to further describe each segment for richer message development insight.

Purpose/Objectives

The purpose of this study was to identify unique target audiences for educational and marketing communication about climate-smart beef production using audience segmentation techniques. We sought to achieve the following objectives:

RO1: Identify and describe audience segments (i.e., target audiences) based on respondents' climate change concern, political ideology, trust in science, and perception of environmental responsibility of the beef industry.

RO2: Describe the identified audience segments' beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics.

Methods

To develop recommendations for strategic educational communication about climate-smart beef practices, we distributed an online Qualtrics survey instrument to identify audience segments based on respondents' climate change concern, political ideology, trust in science, and perception of environmental responsibility of the beef industry. The data in this study are part of a larger survey determined to understand public perception of climate-smart beef practices, with this study describing the aforementioned variables as well as respondents' beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics.

To do so, we sourced a third-party company, Qualtrics, to collect a non-probability, opt-in sample of U.S. residents aged 18-years or older. Non-probability sampling is a technique that uses non-random techniques to invite respondents that match specific characteristics to participate in research through incentives (Lamm & Lamm, 2019; Qualtrics, 2022). We used Qualtrics to recruit respondents from their actively managed research panels to gather 2,340 responses from U.S. residents who matched the nationwide census characteristics for quotas of age, race, and gender the following quotas. Responses were removed from the sample if respondents sped through the survey, took too long, or did not have complete responses. Due to the polarizing nature of climate change and its close relationship with environmental concern, we removed the respondents who selected "prefer not to answer" and "other" to the political ideology question. This resulted in 1,425 usable responses.

Instrument

Data were collected through a series of survey items derived from prior literature and to acquire relevant information. To ensure face and content validity, a panel of experts in animal sciences and agricultural communications reviewed the survey instrument for content accuracy, clarity of wording, readability, and survey flow (Wimmer & Domminick, 2014). Prior to launching the survey for data collection, a pilot test was conducted with 50 respondents to ensure the reliability of the adapted and developed scale items. All scale items were found to be reliable ($\alpha = .80$ or higher), and we continued with data collection procedures (Wimmer & Domminick, 2014). Respondents completed the University approved IRB consent form and were then asked a series of questions about their perceptions of climate change, sustainable agriculture practices, and other personal characteristics.

Climate change concern (Cronbach $\alpha = .921$) was measured by giving respondents the following statements and asking them to rate their agreement (1 = *strongly disagree*, 5 = *strongly*

agree): “I am worried about climate change”, “I believe that climate change will harm humans”, and “I believe that climate change will harm plants and animals” (Bouman et al., 2020).

Perceived environmental responsibility of the beef industry (Cronbach $\alpha = .839$) was measured using Burnier et al.’s (2021) scale to assess the respondent’s perceived responsibility the beef industry has to the environment. Respondents were given the following statements and asked to rate their level of agreement with them (1 = *strongly disagree*, 5 = *strongly agree*): “I am concerned if producers adopt practices that reduce greenhouse gas emissions”, “I am concerned if beef comes from farms that have not undergone deforestation,” and “I am concerned if beef comes from farms that conserve water and avoid its waste.”

Political ideology was considered due to its relationship with climate change behaviors and perceptions. To measure political ideology, respondents were asked “how would you describe your political view,” with option statements of *very liberal*, *slightly liberal*, *moderate*, *slightly conservative*, *very conservative*, and *prefer not to answer*. Respondents who answer prefer not to answer were excluded from the analysis of the data during initial data cleaning.

Trust in science (Cronbach $\alpha = .880$) was measured by asking respondents how much they trust scientists to, “Create knowledge that is unbiased and accurate”, “create knowledge that is useful”, “advise government officials on policy”, and “inform the public on important issues”, on a scale of 1 = *completely distrust* to 5 = *completely trust* (McCright et al., 2013).

Beef consumption frequency was measured to understand how frequently the sample consumed beef. We asked them, “In a typical week, how often do you eat beef or beef products?” with the following options: never, 1-2 days per week, 3-4 days per week, 5-6 days per week.

Attitude towards sustainable food products (Cronbach $\alpha = .874$) was from Burnier et al.’s (2021) and asked respondents to rate their level of agreement (1 = *strongly disagree*, 5 = *strongly agree*) with the following statements: “I prefer foods that are produced respecting the environment”, “I am willing to pay more for products and foods that do not harm the environment”, “I buy organic products because I believe they are healthier”, “I buy grass-fed beef because I believe it is better for the environment”, “I buy GMO free products because I believe they are healthier,” and “I buy antibiotic free meat because I believe it is healthier.”

Preferred sources captured where people seek information about animal agriculture. Respondents were asked to, “Please select your level of agreement with the following items. When seeking out information about animal agriculture, I seek out the following sources:” with sources listed in results section. Each source was rated from 1 = *strongly disagree* to 5 = *strongly agree*.

Data Analysis

Data were analyzed using SPSS 29 and by performing a two-step cluster analysis. To create unique clusters, the variables used in the analysis (climate change concern, political ideology, trust in science, and perception of environmental responsibility of the beef industry) were initially converted into Z-scores to achieve comparable scales (Runge et al., 2018; Ward, 1963). We then conducted a Hierarchical Cluster Analysis (HCA) using Ward’s method to provide a

visual representation (a dendrogram) of the agglomeration schedule (Ward, 1963). The agglomeration schedule figure showed an initial break from the group around point four, indicating significant differences between respondents sorted into four groups (Everitt, 2011). Then, a K-means cluster analysis assigned each respondent to one of the four identified segments. After this, analyses of variance (ANOVAs) and descriptive crosstabs were conducted to determine how the clusters compared based on descriptive means and frequencies of beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics.

Results/Findings

ROI: Identify and describe audience segments (i.e., target audiences) based on respondents’ climate change concern, political ideology, trust in science, and perception of environmental responsibility of the beef industry.

A K-means Cluster analysis was performed to segment the sample into unique groups (Everitt, 2011). The K-means analysis provided the Z scores of the final centroids (Mean Z score) for the four specified clusters. Table 1 describes the average Z score of each variable within the cluster. The segments were validated using ANOVA, which indicated each variable contributed to the cluster formation and the segments were statistically significantly different at $p < .001$ (Everitt, 2011; Runge et al., 2018).

Table 1

Z scores of Final Cluster Analysis Centers resulting from K Means Analysis (N =1425)

	Cluster 1 (n = 300)	Cluster 2 (n = 189)	Cluster 3 (n = 421)	Cluster 4 (n = 515)	F(3,1424)	p
Political Ideology	-1.37	.807	0.341	0.231	550.09	.001
CC Concern	0.784	-1.73	0.620	-0.331	995.69	<.001
Trust in Science	0.648	-1.50	0.632	-0.346	576.15	<.001
Env. Responsibility	0.459	-1.09	0.672	-0.416	313.39	<.001

Note: Variables are standardized using Z Scores. For political ideology, a negative Z score represents a person who identifies more liberally and a positive Z score represents a person who identifies more conservatively. For climate change concern, trust in science, and perceived environmental responsibility, of the beef industry a negative Z score represents lower levels of concern, trust, and responsibility and a positive score represents higher levels of these areas.

The K-means analysis indicated four unique audience segments described below. Cluster 1 ($n = 300$) was composed of those who were very liberal (Z Score = -1.37), were concerned about climate change (Z Score = .784), trusted science (Z Score = .648), and thought the beef industry should be slightly environmentally responsible (Z Score = .459). Cluster 2 ($n = 189$) represented those who were slightly conservative (Z Score = .807), very unconcerned with climate change (Z Score = -1.73), very untrusting of science (Z Score = -1.50), and had low levels of perceived environmental responsibility of the beef industry (Z Score = -1.09). Cluster 3 ($n = 421$) consisted of those who were politically moderate (Z Score = .341), were concerned about climate change (Z Score = .620), trusted science (Z Score = .632), and perceived the beef industry to have environmental responsibility (Z Score = .672). Cluster 4 ($n = 515$) was composed of those who were politically moderate (Z Score = .231), moderately concerned about climate change (Z Score

= -.331), moderately trusting of science (Z Score = -.346), and had moderate perceived environmental responsibility of the beef industry (Z Score = -.416).

RO2: Describe the identified audience segments’ beef consumption frequency, attitude toward sustainable food products, preferred communication sources, and demographic characteristics.

Beef Consumption Frequency

Table 2 represents the frequency of beef consumption for each identified cluster group. Most respondents in each group consumed beef 1-2 days per week. Group 2 contained the most respondents who consumed beef 5-6 days per week ($n = 31$; 16.4%). Group 1 contained the most respondents who never consume beef ($n = 43$; 14.3%). A chi-squared test did not indicate statistically significant differences between groups, $X^2(9) = 15.94, p = .07$.

Table 2
Crosstabs of Beef Consumption Frequency by Cluster (N = 1,425)

	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	<i>(n = 300)</i>		<i>(n = 189)</i>		<i>(n = 421)</i>		<i>(n = 515)</i>	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Never	43	14.3	13	6.9	32	7.6	42	8.2
1-2 days per week	133	44.3	90	47.6	204	48.5	251	48.7
3-4 days per week	92	30.7	55	29.1	123	29.2	151	29.3
5-6 days per week	32	10.7	31	16.4	62	14.7	71	13.8

Attitude Toward Sustainable Food Products

We found statistically significant differences between the each of the clusters’ attitude toward sustainable products, $F(3,1424) = 171.13, p < .001, \eta^2 = .27$. Table 3 represents each cluster’s attitude toward sustainable food products. Bonferroni post hoc comparisons revealed Cluster 1 ($M = 3.83$) had statistically significant more positive attitudes toward sustainable food products than Cluster 2 ($M = 2.55, p < .001$) and Cluster 4 ($M = 3.19, p < .001$).

Table 3
Cluster Memberships Attitude Toward Sustainable Food Products (N =1425)

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		F	p	η^2
	<i>(n = 300)</i>		<i>(n = 189)</i>		<i>(n = 421)</i>		<i>(n = 515)</i>				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Attitude Toward Sus. Products	3.83	0.84	2.55	1.03	3.89	0.77	3.19	0.65	171.13	.001	.27

Preferred Communication Sources

Cluster 1 agreed that they sought out information from the U.S. Environmental Protection Agency (EPA) ($M = 4.00, SD = 1.06$) and the U.S. Food and Drug Administration (FDA) ($M = 3.98, SD = 1.02$). Cluster 1 had the highest mean of any cluster for all types of information sources.

Cluster 2 neither agreed nor disagreed that they sought out information from websites ($M = 2.74$, $SD = 1.34$) and local officials ($M = 2.53$, $SD = 1.21$); however, they generally disagreed that they sought out information via social media such as Twitter or TikTok ($M = 1.72$, $SD = 1.06$), Facebook ($M = 1.79$, $SD = 1.08$).

Cluster 3 agreed that they sought out information from the U.S. Food and Drug Administration (FDA) ($M = 3.91$, $SD = 1.05$) and the U.S. Environmental Protection Agency (EPA) ($M = 3.84$, $SD = 1.13$).

Cluster 4 neither agreed nor disagreed that they sought out information from the U.S. Food and Drug Administration (FDA) ($M = 3.15$, $SD = .98$) and the United States Environmental Protection Agency (EPA) ($M = 3.07$, $SD = 1.02$). Means and standard deviations for each communication source by cluster are detailed in Table 4.

Table 4
Cluster Memberships Preferred Communication Sources (N = 1,425)

	Cluster 1 (n = 300)		Cluster 2 (n = 189)		Cluster 3 (n = 421)		Cluster 4 (n = 515)		F (3,1424)	p	η^2
	M	SD	M	SD	M	SD	M	SD			
Friends, family, and neighbors	3.07	1.41	2.25	1.24	3.54	1.29	2.93	1.04	35.33	<.001	.069
Medical doctors	3.06	1.42	2.16	1.16	3.19	1.39	2.91	1.08	30.63	<.001	.061
Family doctors	2.93	1.42	2.17	1.17	3.16	1.38	2.91	1.12	26.42	<.001	.053
Newspapers	3.46	1.21	2.19	1.14	3.37	1.28	2.93	.98	61.03	<.001	.114
Television News	3.64	1.09	2.3	1.11	3.55	1.18	2.96	1.02	81.50	<.001	.147
Radio news	3.08	1.30	2.21	1.16	3.21	1.23	2.86	1.02	33.98	<.001	.067
Twitter	2.54	1.49	<u>1.72</u>	1.06	2.71	1.49	<u>2.49</u>	1.15	24.97	<.001	.050
Facebook	2.65	1.48	1.79	1.08	2.84	1.50	2.75	1.20	29.10	<.001	.058
Instagram	2.50	1.50	1.78	1.10	2.75	1.51	2.62	1.10	24.73	<.001	.050
TikTok	2.46	1.49	1.72	1.07	<u>2.61</u>	1.50	2.58	1.20	22.13	<.001	.045
Websites	3.49	1.23	2.74	1.34	3.51	1.24	3.04	1.07	27.72	<.001	.055
Blogs	2.86	1.46	2.13	1.22	3.01	1.42	2.75	1.11	20.65	<.001	.042
Influencers	<u>2.45</u>	1.45	1.79	1.13	2.71	1.45	2.61	1.15	23.47	<.001	.047
Local officials	3.20	1.30	2.53	1.21	3.42	1.27	2.88	1.03	31.17	<.001	.062
Gov. press	3.52	1.19	2.04	1.14	3.43	1.20	2.84	1.05	87.79	<.001	.156
FDA	3.98	1.02	2.44	1.24	3.91	1.05	3.15	.98	125.54	<.001	.210
EPA	4.00	1.06	2.15	1.19	3.84	1.13	3.07	1.02	153.84	<.001	.245
Gov. scientists	3.81	1.07	2.03	1.12	3.72	1.14	3.03	1.02	141.58	<.001	.230
Industry scientists	3.25	1.30	2.11	1.11	3.48	1.20	2.87	.97	71.07	<.001	.130
Univ. Scientists	3.85	1.11	2.35	1.20	3.70	1.14	2.95	.98	110.66	<.001	.189

Note. **Bold** represents the highest mean for that cluster. Underlined represents the lowest.

Demographic Characteristics

Table 5 represents both the sample's total demographic characteristics as well as the characteristics by cluster.

Table 5*Cluster Membership Demographic Characteristics by Cluster Segment (N =1425)*

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Total
	(n = 300)		(n = 189)		(n = 421)		(n = 515)		
	f	%	f	%	f	%	f	%	
Gender									
Man	118	39.3	93	49.2	197	46.8	230	44.7	638
Woman	179	59.7	91	48.1	223	53	281	54.6	774
Non-Binary	2	0.7	2	1.1	1	0.2	4	0.7	9
Prefer not to say	1	0.3	3	1.6	0	0	0	0	4
Age									
18-24	28	9	15	8	25	6	71	14	139
25-34	49	16	17	9	93	22	104	20	263
35-44	47	16	15	8	94	22	120	23	276
45-54	38	13	20	11	40	10	65	13	163
55-64	35	12	43	23	62	15	52	10	192
65+	103	34	78	41	107	25	103	20	391
Income									
Less than \$25K	71	23.7	41	21.7	101	24	133	25.8	346
\$25,000 - \$49,999	82	27.3	56	29.7	109	25.9	148	28.7	395
\$50,000 - \$74,999	53	17.7	39	20.6	73	17.3	86	16.8	251
\$75,000 - \$99,999	22	7.3	18	9.6	55	13.1	64	12.4	159
\$100,000 - \$149,999	47	15.7	24	12.6	56	13.3	46	8.9	173
\$150,000 or more	11	3.7	6	3.2	25	5.9	15	2.9	57
Prefer not to say	14	4.7	5	2.6	2	0.5	23	4.5	44
Education									
Some High School	7	2.3	5	2.7	12	2.9	19	4	43
High School Graduate	66	22	40	21.2	102	24.3	159	31	367
Some College	58	19.3	47	24.9	74	17.6	133	26	312
2 Year Degree	37	12.3	26	13.8	71	16.9	75	14	209
4 Year Degree	80	26.7	45	23.8	111	26.4	96	19	332
Graduate/Professional Degree	51	17	25	13.2	50	11.9	31	6	157
Race^a									
Caucasion	231	77	158	83.6	325	77.2	372	72.2	1163
Am, Indian/Native American or Alaska Native	14	4.7	6	3.2	5	1.2	24	4.6	49
Native Hawaiian or Other Pacific Islander	1	0.3	1	>1	3	1	5	1	10
Black or African American	37	12.3	16	17.9	63	15	78	15.1	194
Asian	12	4	3	1.5	20	4.7	23	4	58
Hispanic	43	14.3	25	13.2	46	10.9	87	16.9	201

Other	8	2.7	6	3.2	14	3	24	5	52
Prefer not to say	3	1	2	1	3	1	7	1	15
Residence Type									
Farm in Rural Area	7	2.3	16	8.5	11	2.6	19	3.7	53
Downtown area in city or town	38	12.7	13	6.9	33	7.9	30	5.8	114
Rural area, not a farm	48	16	51	27	78	18.5	122	23.7	299
Urban or suburban area outside of city limits	154	51.3	77	40.7	221	52.5	243	47.1	695
Subdivision in a town or city	53	17.7	32	16.9	78	18.5	101	19.7	264

^aRace totals do not equal 100% due to the option to choose multiple.

Conclusions & Implications

The purpose of this study was to identify and describe unique target audiences for educational and other strategic communication about climate-smart beef production. While we did not experiment with messages and therefore cannot provide conclusive messaging recommendations, we do discuss the potential best-practices for reaching these audiences. Our conclusions are based on our findings and the social marketing literature stating that identifying and describing target audiences is the first step to developing compelling messages (Grunig, 1989; Warner et al., 2016). These results can guide the development of messages from Extension, communication practitioners, and agricultural educators interested in fostering positive perceptions of climate-smart beef practices and products.

Respondents in cluster 1 were the most politically liberal and had the highest levels of climate change concern and trust in science. They had the second highest level of perceived environmental responsibility of the beef industry and the highest level of those who never eat beef. This cluster had a favorable attitude toward sustainable food products and preferred information from government scientists and agencies (e.g., EPA, FDA). Due to the low levels of beef consumption in this group, but the high levels of climate change concern and perceived environmental responsibility of the beef industry, perhaps this group would be compelled by learning about the ongoing sustainability efforts in the industry. This group may purchase beef labeled as climate-smart due to their favorable attitude toward sustainable food products but may be considered the most difficult-to-budge market due to their low meat consumption.

Cluster 2 contained the most conservative respondents who had the lowest levels of climate change concern, trust in science, and environmental responsibility of the beef industry. This group consumed beef the most frequently (5-6 days a week for 16% of these respondents) and had the least favorable attitude toward sustainable food products. This group indicated they were the least likely to seek out information about sustainability practices. Because of this group's high level of beef consumption and low levels of trust and environmental concern, they may not need communication intended to increase beef consumption and should not be met with communication containing "climate change" less risk adverse message effects (Chinn & Hart, 2021). Future research should investigate whether this audience group has a favorable attitude towards climate-smart beef products if labeled this way.

Those in cluster 3 were politically moderate, were concerned about climate change, trusted science, and had the highest level of perceived environmental responsibility of the beef industry. Respondents in this group were most likely to eat beef 1-2 days a week and had the highest positive attitude toward sustainable food products of any cluster. Like cluster 1, they preferred communication from government scientists and agencies (e.g., FDA, EPA). Due to this group's high level of perceived environmental responsibility of the beef industry, they should be a prime audience for communication intended to educate about ongoing sustainable efforts, particularly those funded by government agencies like the USDA. Based on their positive attitude toward sustainable food and moderate beef consumption, cluster 3 should be an audience of priority for strategic communication.

Cluster 4 was composed of those who were politically moderate, had moderate concern about climate change, moderate trust in science, and moderate perceptions of environmental responsibility of the beef industry. This group tended to eat beef 1-2 days a week and had a relatively positive attitude toward sustainable food products. They too preferred communication from government scientists and agencies. Because this group was rather neutral for each category, it represents the "moveable middle" of an audience, or those without rigid preconceptions. In line with this thinking, this was the largest group, suggesting most respondents have moderate perceptions and a relatively positive attitude toward sustainable food products. This group is "moveable" in the sense that those without hardened viewpoints are more likely to centrally engage with a message and perhaps change their perception (Hemphill & Shapiro, 2019). It should be encouraging that should "blanket" messages need to be delivered to the general public, our findings suggest most people will be in this category. Messages for this group should educate recipients on the positive ongoing sustainability efforts within the industry, such as the adoption and incentivization of climate-smart beef production practices and their impacts, as well as the relatively low emissions of American beef production compared to other countries.

Recommendations for Future Research

This study serves as an exploratory, descriptive effort to identify and describe unique target audiences for climate-smart beef production education and communication. The natural next steps for this line of inquiry would be to experiment with messages tailored to each group to understand the effect of message characteristics on likelihood to purchase climate-smart beef products. Due to the novelty of the market and research in this area, it will remain to be determined if consumers will pay more for beef produced this way, which has shown to come with an increased production cost (de Souza et al., 2017). From the producer perspective, potential exists to investigate producer's willingness to adopt climate-smart practices, including incentives and barriers. Due to the complexity of the landscape, a Q-sort or interviews could be a good way to gather these perceptions. The potential exists to apply diffusion of innovation theories in this area as well to understand producer adoption of these practices. In regard to audience segmentation, much more could be described about each audience segment, including their personal values, agricultural involvement, trust in agriculture, and perceptions of livestock production and climate change.

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Improving Managerial and Leadership Effectiveness in Multistakeholder Organizations

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Organizational leaders and managers face high odds of challenges, operating in a complex web of institutions. Leaders and managers must weave their operations commensurate with funding, parent, and host institutions, which also have divergent interests. One area to explore and advocate for in such situations are roles of leadership and management in multistakeholder organizations. Based on a constructivist orientation, we conducted an inquiry into the Center for Sustainable Rural Livelihoods as a case study, using purposively selected annual reports to conduct content analysis. We first theorized with literature on organizational leadership and management emphasized in artistic and scientific models. We further deciphered the four management and leadership frames including structural, human resources, political, and symbolic, which became our guiding categories in analysis while extracting themes. In the structural frame which provides a vision for success, Thinktank, reframing, facilities, and technology emerged. In human resources, servant leadership, empowerment, support, appreciation, and welcoming and farewells emerged. In the political frame, participatory planning, evaluation; fundraising, and transparency emerged. In the symbolic frame, stories, culture, symbols, and ceremonies emerged. For efficiency, leaders and managers must understand their organizational structure – the architectural foundation for pursuing strategic goals, be visionary, hire the right employees, and properly assign roles based on employees' specialties/expertise/abilities. Control employee turnover, promote egalitarianism, give credit to subordinates, hold employees to standards, lead by influence, and be transparent.

Introduction and Background

Organizational leaders and managers in this 21st century face high odds of challenges (Benner & Tushman, 2015). They operate in a complex web of institutions that have set goals and activities to achieve their objectives. Leaders and managers must weave their operational mandates commensurate with the funding, parent, and host institutions, which all have divergent interests in the same organizations (Bolman & Deal, 2021). Relatedly, organizations are being challenged to think both at local and global scales (Marquis & Battilana, 2009); strategically function well (Battilana & Lee, 2014); and be sustainable (Henderson et al., 2015). Sustainance and management of these challenges than searching for a solution is what makes an organization keep operating. In such a situation, one of the areas to explore and advocate for are the roles of leadership, supervision, administration, and management in such multistakeholder organizations that seek to improve the livelihoods of communities.

In this qualitative inquiry, we describe the leadership and management dispensation of the Center for Sustainable Rural Livelihoods (CSRL), an international non-profit organization based in the College of Agriculture and Life Sciences (CALs) at Iowa State University (ISU) operating in rural Uganda to end hunger (Butler & McMillan, 2015; Ikendi, 2019, pp. 47-64; Ikendi & Retallick, 2023). Born in 2003 out of a sustainable livelihood program, the CSRL operates in a trio partnership with Makerere University Kampala (MAK); Volunteer Efforts for Development Concerns (2004-2014); and ISU-Uganda Program (ISU-UP) 2014 to date (Butler & Acker, 2015). The goal of the CSRL is to end hunger by building the capacity of the

vulnerable rural community, building assets, and improving their economic opportunities. The CSRL uses gifts from private donors to achieve its goals (Butler & McMillan, 2015). Running an organization of this nature requires effective leaders and managers who are knowledgeable of leadership and management strategies, theories, and frameworks.

Theoretical Framework and Literature Review

One of the most notable theories in human resources is Maslow's hierarchy of needs (Maslow, 1943). In this theory, people are motivated first to satisfy their basic needs for physical well-being and safety. Once the needs on the lower ladder are met, individuals move up to love and ego needs, and self-actualization – developing to one's fullest and realizing one's ultimate potential. In responding to organizational challenges using artistic and scientific strategies, managers and leaders borrow the elements of Theory X strategies (McGregor, 1960).

Theory X and the artistic and scientific leadership and management strategies

The assumptions in Theory X are that subordinates are passive, lazy, have little ambition, prefer to be led, and resist change (McGregor, 1960). Conventional practices of this view are built on hard and soft versions of Theory X. The hard concept of Theory X is equivalent to scientific leadership and management strategies where managerial responses are coercion, tight controls, and punishments to institute performance (Taylor, 1919). Scientific management believes in standard resolution to employee performance – rooted in a “one-size-fits-all” solution usually embedded in employee manuals with enclosed codes of conduct and performance appraisal for rewards and promotions (Bagdadli & Gianecchini, 2019). Other scientific but non-employee manual systems involve using digital monitoring devices like vehicle trackers, and security cameras, all of which map out employee productivity in how the time and resources are utilized (Tomczak et al., 2018). However, these devices require disclosure of their use.

The soft side of Theory X aligns with artistic leadership and management strategies. The artistic lens is premised on the belief that managers gain some people skills, knowledge, experience, and wisdom over time in their work and life experiences to lead by influence and have workers perform (Bolman & Deal, 2021). According to Drucker (2020), programs change over time, and the prescribed protocols change which necessitates a change in the employee human resources manuals. Leaders and managers use soft skills like communication and reasoning to avoid conflict and keep everyone happy but influence performance (Mintzberg, 1975). There are high chances of reliance on scientific than artistic leadership and management for quality, innovativeness, and commitment in modern organizations (Bolman & Deal, 2021). Nevertheless, Bolman and Deal posit that leaders are ought to build and implement human resource strategies by developing a clear philosophy of managing the people. These strategies include hiring the right people for a specific position to have productivity; keeping the employee to reduce turnover through proper rewards and internal promotions; investing in employee professional development to keep up with the latest work ethics; empowering employees through support, autonomy, and promote equality; and promoting diversity among employees and emphasize the organizations' philosophy on diversity.

Success in providing leadership to manage organizational challenges and influence performance is premised on leaders' and managers' tactics to weave artistic and scientific strategies within the organizational frames (Bolman & Deal, 2021). In organizational management, a frame is defined as “a mental model – a set of ideas and assumptions – that you

carry in your head to help you understand and negotiate a particular territory” (p. 10). Bolman and Deal identified four organizational frames including structural and human resources; and political and symbolic that influence managerial; and leadership efficiencies respectively. Frames are seen as toolboxes for which picking on the right tool can help to mend the program in the right direction and influence the implementation of activities. These frames work in tandem and reinforce each other for effective operations and the achievement of organizational goals. When one frame has a defect like the poor design of objectives in the structural frame, it sends shocking vibrations in other frames like failure to properly implement field activities due to poor objective design which prompts swift action from the administration to restructure the design and implementation strategies.

Organizational Frames

The hierarchy of an organization is the helm of power vested in the structural frame. This frame prescribes the organization’s primary goal, vision, mission, objectives, and strategies and is also considered the organizational machine which forms the architectural pillars of the organization (Bolman & Deal, 2021). It also stipulates how the goals can be achieved through operational activities in a systematic design, founded on organizational policies, technology, and the working environment. Effective managers must understand the organizational structure because it is the architectural foundation for pursuing strategic goals. They too must assign roles to line managers based on their specialties, expertise, and abilities to effectively contribute to higher output. In this, when organizations are not properly performing; reframing and reorganizing their structure is a powerful tool to provide a new direction for implementation (Bolman & Deal, 2021; Holmes & Scull, 2019). In the structural lens, scientific management is viewed when managers analyze situations logically using facts and data to (re)design better working systems.

The human resources (HR) frame, also known as the extended family, is the heart of the organization dealing with employees, their work, welfare, skills development, and empowerment (Bolman & Deal, 2021). Effective managers in the HR frame focus on improving the relationship between the people and the organization and promoting interpersonal and group dynamics among workers. In HR, it is vital to have a “fit” in the organization where the organization and employees are compatible to avoid the exploitation of either party. Earlier research in HR showed that employers exercised a lot of employee exploitation where the latter was duty-bound to work hard following orders and nothing else beyond a paycheck (Follett, 1918; Mayo, 1933). However, Bolman and Deal (2021) provide among the assumptions that “organizations exist to serve human needs rather than the converse” (p. 121); modern organizations work towards fit as vital to achieve success. Managing people requires the use of both artistic and scientific models to instigate positive perceptions about their work. In the artistic realm, the use of effective communication helps to tear the blocks within the system, show empathy, and care to the subordinates. People and organizations are not mutually exclusive; managers need to tailor their emphasis on the welfare of the employees to improve performance (Bolman & Deal, 2021).

The political frame on the other hand is also referred to as the jungle, a symbol of leadership effectiveness infused with power, conflicts, coalitions, negotiations, and competition within the organization (Bolman & Deal, 2021). The term politics has a negative connotation with metaphors such as “they’re playing politics” or “it was all political” (p. 185); however, in organizations, it is linked to the scarcity of resources amidst divergent interests. Effective leaders

who think in the political frame are bound to lay strategies on how to deal with conflicts as the best option than the resolutions in themselves. Political frame weaves within the structural and HR frames. Structural theorists emphasize authority, rational decisions, monitoring, and assessments, whereas HR theorists emphasize empowerment, participation, and collaboration. Similarly, Bolman and Deal mention that organizational “goals and decisions emerge from bargaining, negotiation, and jockeying for position among competing stakeholders” (p. 192).

The symbolic frame, often referred to as the theatre, is a symbol of leadership effectiveness empathizing with the organizational culture, rituals, heroes, heroines, symbols, metaphors, and ceremonies (Bolman & Deal, 2021). This frame forms the public-facing persona, framing the public relations schema of the organization. Organizations often weave the symbolic frame and the HR together through employee interactions with the public. Similarly, celebrating and recognizing the achievements of employees sends good signals to colleagues, stimulating performance and improving the public recognition of the organization. The meaning of the organizational symbols, events, and actions to the people is intangible, but they shape the public’s thoughts emotions and actions about the organization.

Purpose and Research Questions of the Study

Given the nature of multistakeholder organizations and the different aspects required of leaders and managers, this inquiry was conducted to explore how the Center for Sustainable Rural Livelihoods (CSRL) has practiced its leadership and managerial roles. Guided by the reviewed literature, investigators sought to understand how managerial and leadership efficiencies were achieved in an interplay of applying the artistic and scientific strategies weaved within the four organizational frames of structural, human resources, political, and symbolic frames. The ultimate goal was to establish the techniques and provide advocacy for improving the leadership and managerial effectiveness of the multistakeholder organizations working towards improving community livelihoods. The study was guided by three research questions:

1. In what ways has the CSRL program practiced its managerial roles?
2. In what ways has the CSRL program practiced its leadership roles?
3. What techniques can current, and aspiring leaders, managers, administrators, and supervisors learn from CSRL as a case study to improve their effectiveness?

Methods and Procedures

Consistent with the epistemological assumptions of constructivism, this qualitative inquiry employed a constructivist perspective an “epistemological considerations focusing exclusively on the meaning-making activity of the individual mind” (Crotty, 1998, p. 58). The inquiry was informed by the notion that knowledge is socially constructed and meaning emerges inductively. We employed a case study design to conduct a content analysis (Creswell & Poth, 2018). The units of analysis were the CSRL annual reports. Data were contained in these reports. We collected and analyzed data on an individual report basis in the Spring of 2021. By then, there were a total of seven annual reports available to us in digital form between 2014–2020.

Sample selection

Four CSRL annual reports (CSRL, 2014; 2018; 2019; 2020) were purposively selected, downloaded from the website (CSRL, n.d), and analyzed as study cases (units of analysis). The year 2014 was selected because it is when the program underwent organizational reframing,

registering Iowa State University Uganda Program (ISU-UP) as a new NGO partner (Butler & Acker, 2015) and subsequent change of operational models from farmer-farmer (Masinde et al., 2015) to a comprehensive approach to capacity building (Ikendi, 2019, pp. 47-64). In 2018, the program embarked on a comprehensive evaluation that involved an external evaluation commission and deciphering of the internal monitoring and evaluation data. Additionally, a time capsule was sealed to be opened in 2050 as a mark for the commissioning and handover of the Mpirigiti Rural Training Center, the home of the CSRL/ISU-UP in Uganda (CSRL, 2019).

The year 2019 was selected because ISU inaugurated a newly Endowed Dean's, Chair of the CALS which is the home of the CSRL program at ISU. The CALS Dean influences the operations of the CSRL. Similarly, 2019 is when the vision and mission statements of CSRL/ISU-UP were restated, and also in a Thinktank members set goals for the next five years of 2020-2024, after the end of the 2014/2019 first CSRL/ISU-UP strategic plan phase. The year 2020 was selected because it is when CSRL operationalized its 2020/2024 strategic plan amidst the shock of the COVID-19 pandemic. Similarly, changes in leadership with the appointment of the new CSRL Director and Associate Directors following the retirement of their predecessors.

Data analysis and presentation

We intended to generate rich detailed descriptions of our account from cases' representations of leadership and management dispensation to answer our research questions. We began with naïve reading to hone ourselves with the information contained in the reports and we further employed an in-depth document reading and analysis. We engaged in a dialogue with our data by asking interesting and useful questions as recommended by Shank (2006) on how organizational leadership and management frames (i.e., structural, human resources, political, & symbolic) were represented. In the process, we sought to recognize and classify commonalities across the cases as well as perspectives that appeared distinct among them. In addition, we wrote analytic memos to reflect on emerging unique ideas which formed our themes.

We also critically observed the artifacts and pictures captioned in each case took notes and memos on each intuitive caption that we used to generate new themes as a form of triangulation, and also help us in discussion (Lincoln & Guba, 1985; Saldana, 2016). We based our analysis on the four organizational frames described in the literature review as our guiding categories including structural, human resources, political, and symbolic frames. Our analysis focused on a particular frame, including how the frame was represented, the pattern in which it was represented, and the interconnectedness with other frames. Also, the leadership and managerial elements that depicted artistic or scientific in the organizational frames were all noted down in the analytic memos which guided our discussions.

Themes emerged inductively in this thematic analysis process as we closely read and interpreted the writings for each case (Lincoln & Guba, 1985; Saldana, 2016). We used a continual comparison amongst themes and aligned them into categories based on the four organizational frames to describe predominant themes related to negotiating distinctiveness and look-alike extracts within and amongst the cases. This process allowed us to report an account individually and/or on case-based themes. In this study, we defined a category as the main descriptor representing the four organizational frames that include structural, human resources, political, and symbolic frames. Themes as those descriptors that emerged to support each category (frames), and codes are the smallest descriptors that support the themes.

Findings are presented based on the categories (four organizational frames) and themes, concurrently with the discussions. We shared our insights into the findings, making connections between categories and themes within and amongst the cases and with artistic and/or scientific elements in each category and/or theme. We further theorized with literature across different schools of thought on organizational leadership and management in similar multistakeholder organizations. Important messages related to leadership and management were also extracted from personal communications from a different program and/or institutional managers, leaders, administrators, and/or supervisors where the investigators participated in the various invited speeches. The findings were presented in form of rich thick descriptions and the cases' accounts through verbatim statements. This presentation was done to allow other researchers and readers who could potentially consider these findings and their use within their unique study and/or organizational settings as we advocated for an improvement in the leadership and managerial effectiveness of programs contributing to community livelihoods.

Establishing goodness and trustworthiness

These concepts specifically focus on an account of the data but not the data itself or its methods. We exercised caution on reporting correctly, making sure to be consistent with obtained data, and the purpose of the study. In reporting, we ensured that no information was concealed; most importantly reporting in thick descriptions to account for the cases' representation on each organizational frame and use of verbatim statements extracted from the cases. We reflected on our positionality and reflexivity as well as our paper trail generated throughout this investigation to control for personal bias that could impact the findings (Lincoln & Guba, 1985). Much support was sought from our peers familiar with the qualitative inquiry, leadership, management, and program Directors through debriefing by sharing our themes and getting their feedback which we embedded into our discussions.

Researcher positionality and reflexivity

Discussing the positionality in qualitative research is important to weave the relationship between the researcher and the researched (Lincoln & Guba, 1985). It describes how the distance is minimized as we are required to get immersed in the field. The principal investigator (PI) in this inquiry is a native of Kamuli, Uganda where the CSRL/ISU-UP implements livelihood interventions. The investigator has been involved in the program's monitoring and evaluation as a research assistant since 2017 while pursuing graduate studies under the supervision of the co-author and CSRL program directors. The PI's positionality eased data collection, analysis, and interpretation because of continuous engagement in the program; reading the program's annual reports as they are published to enhance graduate school research; and also working with the program's evaluations. We kept a continuous reflexive awareness in the whole research process in such a setting where the PI was involved in the program directly to help keep up the research agenda and reduce biasing of the results as advised by Savvides et al. (2014).

Findings and Discussions

Our findings in this section are presented in categories describing the four organizational frames. These frames are aligned to research questions where frames including structural and human resources depict managerial efficiency; and political and symbolic depict leadership efficiency (Bolman & Deal, 2021). Each frame has different themes (Table 1) but most important, none of the frames works in isolation from the other.

Table 1

Summary of Emergent Themes Aligned By Categories Representing the Managerial and Leadership Effectiveness in the Center for Sustainable Rural Livelihoods.

Categories or Organization Frames	Themes That Emerged in Each Category or Frame
<i>Managerial Roles and Effectiveness</i>	
Structural Frame <ul style="list-style-type: none">• The Machine	1. Thinktanks 2. Reframing 3. Facilities 4. Technology
Human Resources Frame <ul style="list-style-type: none">• The People• The Extended Family	1. Servant leadership 2. Empowerment 3. Professional support 4. Appreciation, honors, and rewards 5. Welcoming and farewells.
<i>Leadership Roles and Effectiveness</i>	
Political Frame <ul style="list-style-type: none">• The Jungle	1. Participatory planning and evaluation 2. Fundraising 3. Accountability and transparency
Symbolic Frame <ul style="list-style-type: none">• The Theatre	1. Stories 2. Culture 3. Symbols. 4. Ceremonies and celebrations

Each frame sees a leader and/or manager and leadership and management in a different perspective and the leader and/or manager borrows elements from each frame to be effective. These categories and themes are concurrently presented and discussed as follows.

Research question one: In what ways has the CSRL program practiced its managerial roles?

The themes that emerged from both structural and human resources organizational frames depict how CSRL practiced its managerial roles which are representative of organizational efficiency in management (Bolman & Deal, 2021). The categories are discussed as follows.

The Structural Frame (The Machine)

The structural frame is the engine of organizational design and functionality among designed departments. It is the helm of organizational planning and must be set up properly to rise to other frames because they all work congruently. In this frame, four themes emerged including Thinktanks, reframing, technology, and facilities.

The CSRL program adopted Thinktanks in its structural setting since its inception in the early 2000s to involve stakeholders in planning (Butler & Mazur, 2015). In the 2019 Thinktank, stakeholders challenged themselves to plan for the next five years of 2020-2024, after the end of the 2014/2019 first ISU-UP strategic plan phase as depicted in the extract. “...and a Kamuli-based thinktank to challenge CSRL and ISU-UP with innovative ideas ... culminated with a workshop ... attended by 25... program leaders along with local community leaders.” (CRSL,

2020, p. 2). Thinktanks have been used globally to brainstorm ideas that inform policy and guide planning, implementation, and evaluation (McGann, 2018). In organizations, management is linked to the implementation of ideas vested in the vision and mission statements. In doing this, managers and leaders ought not to make decisions unilaterally, must delegate and involve people in decision-making (A. Oberhauser, personal communication, March 23, 2021). The involvement of expert delegates in Thinktanks during planning symbolized a scientific management style and the involvement of local community members symbolized artistic and overall collaborative planning.

In reframing, CSRL underwent an overhaul in 2014 with the severance of the VEDCO partnership; registration of their ISU-UP partner (Butler & Acker, 2015); change of operational model (Ikendi, 2019, pp. 47-64); and restatement of the mission and vision. Old mission “*To support resilient, sustainable rural livelihoods through the discovery and application of science-based and indigenous knowledge*” Restated mission: “*CSRL and ISU-UP use the power of education to develop sustainable communities and responsible global citizens*” (CSRL, 2020, p. 2). Reframing involves thinking from multiple angles to develop alternative diagnostic approaches vital for the development of organizational management to improve the performance of tasks (Bolman & Deal, 2021; Holmes & Scull, 2019).

Programs’ reframing strategies are determined by the goodness of their management and leadership. For instance, people managers and leaders in other institutions have also been successful in their endeavors during the reframing phase of their institutions. In Uganda, Venansius Baryamureeba the former Vice-Chancellor of Makerere University reframed it from a faculty to a collegiate system to improve efficiency and management due to increased enrollment and competition from private universities (Bisaso, 2017). In the U.S., Michael Crow successfully reframed Arizona State University from a public agency - relying on state dollar appropriations to a public enterprise - doing business with partners and involving them in decision-making (M. Crow, personal communication, April 2, 2021). Similarly, reframing turned Allan Mulally, the CEO of Ford into visionary and innovative personnel sailing through the business waves, making Ford not only a car company but a mobility too (Borins & Herst, 2018).

In technology, the construction of the Mpirigiti Rural Training Center conformed to the global green principles to reduce carbon footprints (Andrews & Friis, 2012; United Nations, 2019). For instance, “*Wastewater is recycled using an anaerobic biogas digester and constructed wetlands ... Solar water heaters provide hot water and photovoltaic panels generate power. Natural ventilation, ... shade trees help keep the rooms cool*” (CSRL, 2018, p. 4). Despite CSRL being a livelihood program, all its activities involve the use of technology and have to adapt to the current revolution. Most importantly being anchored between two global universities of (i.e., Iowa State University and Makerere University).

In facilities, the construction of training, Office, and residential facilities eased program coordination of activities. For instance, coordinators normally travel to communities to engage in farmer field visits with students (Ikendi et al., 2023). “*Mpirigiti Rural Training Centre Opens its Doors: The new training center means ... space to serve an even greater number of students...*” (CSRL, 2018, p. 2); ... “*Introduction of the livestock demonstration farm is a great opportunity for farmers. ... where they acquire knowledge in livestock management ...*” (CSRL, 2019, p. 4). Similarly, in communities, CSRL set up malnutrition rehabilitation centers, each with a training house, latrines, bathroom, and kitchen to facilitate adult education (CSRL, 2019; Ikendi, 2019).

The Human Resources Frame (The People or Extended Family)

In the human resources frame, five themes emerged including servant leadership, empowerment, professional support, appreciation, and welcoming and/or farewells. A leader/manager under the human resources frame is a catalyst and servant, providing the leadership process in a supportive and empowering manner. The performance, satisfaction, and retention of employees are highly dependent on the management of the people.

Servant leadership was demonstrated by Directors in an altruistic calling, with the power of wisdom to deliver their communities from trauma during the COVID-19 Pandemic and weather catastrophe. “...current circumstances require us to pivot toward including some relief services... flexibility of CSRL donor support, ISU-UP relief efforts began almost immediately with delivery of maize flour, rice, soap...” (CSRL, 2020, p. 4). “... flooding displaced over 2,500 families in Buyende ... Even though this was outside of the geographic boundaries ... staff knew they needed to respond and respond quickly. ... They didn’t wait around for permission to act” (CSRL, 2020, p.6). This level of management and leadership practice defines a servant and people power leader whose fabric is in the art of dispensing that “natural feeling that one wants to serve, to serve first” (Greenleaf, 1977, p. 15). Servant leaders help their subordinates to grow, empower them to build independence, trust, creativity, and innovativeness, and build community (Ikendi et al., 2022a; Russell et al., 2017). This in turn helps workers get satisfied and move smoothly along the ladder of needs described by Maslow (1943). The program leadership further defines a transformative and empowering leader whose response broke down the bureaucracy that would be exercised to get approval from the top levels of administration to act.

The CSRL administration empowered its staff, and these have developed from lower-level jobs to promotions and turned into influential people in their communities. For instance, “While graduates of the nutrition education program go on to care for their own families, ... Other graduates assume leadership roles in the NECs, becoming trainers or mentors for new enrollees, ...” (CSRL, 2014, p. 7). The Nutrition Education Centers (NECs) are rehabilitation homes for managing malnutrition (Ikendi, 2019). Also, “In 2010, [Dan] joined the ISU-Uganda Program as a research assistant working on a grain amaranth.... Today, he is the service learning and school garden projects officer” (CSRL, 2018, p. 8). Empowerment is among the priorities in organizations, and these have reformed the U.S. Iowa State 4-H youth program in the promotion of extension education (D. Nistler, personal communication, March 26, 2021). This is true because independent and empowered staff gain trust in their managers and leaders which reduces the cost of supervision and also improves loyalty at work (Ton, 2014).

In providing professional support, the CSRL program enabled service-learning alumni to invent a pedal-operated grain cleaner which has been adopted in communities to reduce grain and postharvest losses (Ikendi, 2022; Ikendi et al., 2022b; Mayanja et al., 2018). This was the scenario “When [Issa] was a ... service learner, he cleaned maize ... by winnowing and using a grain sieve. Finding the process tedious, ... with support from ISU-UP ..., he created his first pedal-operated maize cleaner” (CSRL, 2020, p. 14). Because CSRL relies on scientific research to guide innovations (Acker et al., 2015; Ikendi & Retallick, 2023), research support among service-learners is a plausible venture because they get work with communities, identify problems, and brainstorm solutions (Ikendi, 2022; Stoecker, 2014).

In appreciation, honors, and rewards, the CALS Dean honored the incoming and outgoing CSRL Directors for their resilience and dedicated service to the program and

communities. “*This past fall I had the pleasure of honoring ... [Don], with my Dean’s Citation for Extraordinary Contributions to CALS, and for [Dina], the college’s Lifetime Achievement Award*” (CSRL, 2019, p. ii). This appreciation shows how managers and/or leaders care about the value of employees (Krishnaveni & Monica, 2018). Schwartz and Porath (2014) wrote an opinion describing why white-collar employees feel less satisfied and linked it to a lack of appreciation from their bosses. Appreciated employees tend to have self-esteem, innovative ideas, and good communication which improves performance (Gilbert & Kelloway, 2018).

In welcomes and farewells, welcoming new staff is a way of expressing what their vision is, ahead of their job challenge in this onboarding process (Caldwell & Peters, 2018). CSRL welcomes: “[Don]..., and, as of January 2020, CSRL director... [Ken] took over as the CSRL associate director for livestock development” [Leo] has joined CSRL as the associate director of agronomy...” (CSRL, 2020, p. 16). Similarly, farewell to retirees is a good gesture as they become ambassadors with wisdom, and their achievements are inspirational for staff to work hard and build on their success. CSRL thanks: [Dina],... “*As CSRL director, [Dina] was involved with impacting the lives of more than 60,000 people. “Her legacy with CSRL will be a high functioning organization ... ”; “...[Ron] launched and then led a truly outstanding livestock program in Uganda” “... directly impacted more than 5,000 farmers ... through training, livestock distribution, and improved food security”* (CSRL, 2020, p.17). Be a servant leader, help, carry resources, coach, be available, and celebrate the success of others, such qualities help lead to successful extension education programs in achieving capacity building for food and nutrition security within communities (J. Lawrence, personal communication, April 16, 2021).

Research question two: In what ways has the CSRL program practiced its leadership roles?

The themes that emerged from both political and symbolic organizational frames depict how CSRL practiced its leadership roles and are representative of organizational efficiency in leadership (Bolman & Deal, 2021).

The Political Frame (The Jungle)

Effective leaders through the lens of the political frame are termed advocates and negotiators. Their leadership process is through advocacy and coalition building. Organizations are considered roiling arenas which require building coalitions between members of different interests for a common goal of sharing and use of scarce resources. In the political frame, three themes emerged including participatory planning, evaluation, fundraising, and transparency.

In participatory planning, coalitions were depicted in the Thinktank while setting goals. The extract below demonstrates the process: “*Two years ago, CSRL began a comprehensive evaluation process including ..., community stakeholders... The workshop involved an assessment of strengths, selecting the six most important goals for the next five years*” (CSRL, 2020, p. 2). Coalition success is a factor of leadership competence (Bolman & Deal, 2021; Greene et al., 2021). Leadership provides a vision for the organization which requires cooperation with colleagues. Involving stakeholders to set goals improves on implementation, monitoring, and evaluation of projects.

In fundraising, the CSRL leadership understands its partners and benefactors which built a cordial relationship to a level of self-initiated moves to raise funds in many ways. “.... [they]

decided to run a marathon to raise funds for the schools ... and collected sponsorships to run the IMT Des Moines in October of 2019. ... raised more than \$10,000” (CSRL, 2020, p. 1). Effective resource sourcing for nonprofit organizations through fundraising is linked to leadership efficiency (Scaife et al., 2013). [Ann’s] passion arose out of participating in a service-learning program and developing the passion to do something from her talent to help the community. Students who participate in study abroad are likely to have a likelihood of participating in charitable work (Ikendi, 2022; Ikendi et al., 2022c; Paige et al., 2009).

Accountability and transparency are healthy practices for organizations to show where the money comes from and goes as illustrated by the CSRL program. *“Our program relies on the generosity of donors.... we owe them complete transparency in how we use their gifts.” ... \$1.6 million invested: How our work is funded: 69% Donor funding, ... Where your giving goes: 31% Community/school nutrition, 24% Education, 23%...*” (CSRL, 2020, p. 17). The CSRL adopted the voluntary disclosure of financials which are key elements in achieving sustainability, governance, and accountability, and a gesture of social credibility to the stakeholders (Sanzo-Pérez et al., 2017). The allocation of resources among the units illustrates the hard-to-reach decisions that happen during program budgeting and rationing of funds among all units with divergent interests but working towards a common goal.

Symbolic Frame (The Theatre)

In the symbolic frame, the leader is seen as a prophet and poet, practicing leadership processes in form of inspiration and meaning-making central to shaping the performance spirit and persona of the organization (Bolman & Deal, 2021). Leaders play the leadership role in the organization as theatre where the public is watching the actor’s actions as they derive meaning from the actions. In the symbolic frame, four themes emerged out of this frame including stories, culture, symbols, and ceremonies and celebrations.

In stories, the CSRL uses a theory of change as emulated in the story of [Rey] below which depicts the constricted values of the partners. *“.... She was enrolled at [Nutrition Center] in 2013 with a malnourished child. ... and graduated in 2014. ..., attended livestock management training and expressed interest in joining the piggery project.” ...” In June 2019, [Rey] received an above-ground 6,000-liter water tank. ...”* (CSRL, 2019, p. 6). Stories communicate the organizational ethos and culture which is powerful in sharing historical knowledge, values, and identity, sparking actions, and envisioning the future (Bolman & Deal, 2021). Stories convey vivid information convincingly and thus hold a powerful grip of imagination, powerful in changing behavior and instigating new perceptions (Gottschall, 2012).

The CSRL shaped its culture in the community, by seeing a problem, acting in collaboration, and monitoring performance. For instance, *“The Uganda lockdown ... forced an abrupt change to the way education was delivered ... ISU-UP field specialists ..., quickly created plans to keep students engaged. ... Guided by the Kamuli District Education office and worked with parents ... worked with headteachers of each school to enlist teachers who could help in evaluating the students’ work”* (CSRL, 2020, p. 10). The organizational culture illustrates how things are done, arising out of continued interaction with the community, and understanding each other which improves job satisfaction and performance (Muafi & Azim, 2019).

In symbols, the CSRL sealed a time capsule to be opened in 2050 which embedded an astonishing message from Iowa State University President: *“Dear People of the Year 2050: Greetings from the year 2018! This year we dedicated the Mpirigiti Rural Training Centre ... main messages ... Let us end hunger but let us never stop hungering for knowledge”* (CSRL, 2018, p. ii). Symbols have got an intrinsic value, they bear a communally constructed meaning to the community beyond their imagination (Bolman & Deal, 2021). The President’s message also reinforces the land grant ethos of ISU abroad, helping communities improve their livelihoods through livelihood education programs for capacity building (Ikendi & Retallick, 2023).

In ceremonies and celebrations, the CSRL celebrated the first decade of humanitarian deliverance in the Kamuli district in 2014. The extract reads: *“CSRL ... celebrated its 10th anniversary in 2014 - and made significant gains in advancing its mission to combat global hunger, ... Transformative change takes time ... something good is coming from Kamuli district, ...”* (CSRL, 2014, p. 1). Ceremonies are grander that bring together people, reassuring them of the vision on track, symbolizing triumph, and offering hope (Bolman & Deal, 2021).

Research question three: What techniques can current, and aspiring leaders, managers, administrators, and supervisors learn from CSRL as a case study to improve their effectiveness?

Drawing insights from the organizational management and leadership strategies and frames helps to empower managers and leaders to understand their work praxis. Resolving conflicts in organizations is not necessarily about just following prescribed procedures and protocols. It also requires developing a personally informed art of tailoring both knowledge and structural mechanisms to specific situations. A successful manager or leader can navigate potentially conflictual situations with an organization’s protocols in mind while simultaneously knowing when to apply which aspect and adapting them to best suit each unique circumstance.

In achieving managerial efficiency both artistic and scientific management styles across the structural and human resources frames are vital. In this respect, being passionate about employees, understanding their working style, and use of soft-skill communication tactics formed the ingredients of the artistic management style across all the CSRL cases analyzed. In the 2019 Thinktank where participation involved experts in setting goals signaled scientific style, and the local community implied artistic. Overall participation of staff, leaders, and the community meant decisions are made collectively. The directors played a “game manager’s” role, entangled in management, supervision, and administration. The success of these twisted titles was depicted in servant leadership, empowerment, the delegation of powers, and reframing.

In dispensing leadership for efficiency, the CSRL leaders blended the artistic and scientific leadership styles across the political and symbolic frames. Understanding employees’ social and political environment and effective communication tactics depicted the artistic aspect of leadership. Setting goals and monitoring them on the mark characterized the scientific style. Participatory planning monitoring and evaluation, where also participatory involved experts signaled scientific model, and community implied artistic model. Efficient communication culminated in satisfaction for the benefactors, beneficiaries, and the general community. It is out of effective leadership coupled with personal desires to make the world a better place that members got into self-drive to initiate fundraising campaigns with passion.

Recommendations/Techniques for Effective Management and Leadership

We provide the following recommendations in our advocacy to current and aspiring managers, supervisors, administrators, and/or leaders. Recognize that there is no perfect management style, and be yourself, genuine, and generous. Professionally hold the subordinates accountable through appraisals based on program goals. Confront subordinates who are not productive and hold them to standards and appreciate those who are productive. Be supportive and empower everyone to perform, and overall never waver in your resolve to support your subordinates. Having a vision is the core of management, always get people together and discuss the progress to achieve the vision. Credit subordinates' contributions in your communication – verbal and/or written and pick on and/or refer them to elaborate on their idea(s) during discussions and meetings.

Understand that management is not the greatest job BUT it creates well-functioning systems. Management is all about implementation, you must know that things RUN on time. Supervision is about monitoring program components and assessments, and always check-in in with the line managers or supervisors to see how things are running in different departments. In administration, where you combine leadership and management, do persuasion, exercise power to influence, be consistent, and calculate your reactions. Effective administration needs effective leadership and management to move the program implementation strategies forward.

Give credit to others before yourself, listen more than talk, and focus your engagements on your subordinates. Systematically climb the ladder of promotion; skills develop stage by stage as you climb the ladder. People like leaders have experienced what they are experiencing now. Love people and care about them. Go by your strength and build on it further. Do not be afraid of mistakes; the most important aspect is to acknowledge and revise for improvement. Network with people for support and feedback. A good leader is visionary, uses symbols, tell stories, and frame experiences in ways that give employees hope. Be ready to use feelings and intuition to enhance creativity. Leaders are risk-takers, respond to life's dilemmas playfully, find meaning and faith amidst the confusion, and move programs with delight.

Motivation is key, to helping others succeed – leaders' primary focus is to lead others to grow. The most rewarding in leadership is when your subordinates succeed. Prepare for the challenging times, most important is not the solution but the process of providing the solution. As a good leader, you have to mobilize the resources needed to advocate and fight for all units of the organization. Be transparent to account for donor and public funds to increase your social credibility in the institution and the institution's public face.

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The Effects of Reflection Mode and Transfer Level on Students' Transfer Skills While Learning Experientially

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Experiential learning is used extensively in post-secondary agricultural education settings. Reflection and application are critical components of the experiential learning process to ensure that learners' experiences are educative. The purpose of this study was to examine the effects of reflection mode (written journal or peer verbal) and transfer level (same, near, or far transfer) on students' transfer skills while learning experientially in an undergraduate animal science course. Linear mixed modeling was used to examine the effects of all predictor variables (time, the experimental independent variables, and the variable of prior knowledge) on transfer skill quiz scores. Time (in weeks) had a positive, significant effect on participants' transfer skill quiz scores. The independent variable of transfer level, near transfer had a negative, significant effect when referenced against far transfer, suggesting that learners who were in far transfer groups would achieve higher transfer skill scores. This overall pattern suggests teaching toward far transfer might be more effective than same or near transfer and should be further explored. For those who aim to teach for transfer, it is critical that real-life, practical experiences are included, and experiential learning is an effective approach to accomplish this.

Introduction

Experiential learning is used extensively at the post-secondary level (Eyler, 2009; Kolb, 2015; Nilson, 2016), especially in agriculturally related colleges and courses (Estep & Roberts, 2011). The National Academies of Sciences, Engineering, and Math (NASEM, 2021) recommended the use of experiential learning in order to prepare the future workforce entering the field of agriculture, food, and natural resources (AFNR). Eyler (2009) suggested that, while traditional experiences such as internships and fieldwork are important for vocationally and professionally oriented college tracks, experiential learning has the power to build intellectual capacity within liberal education. In the higher education classroom setting, experiential learning can build deep comprehension of subject matter, stimulate critical thinking, foster knowledge application and transfer, and promote life-long learning among students (Eyler, 2009). A fundamental goal of higher education is student mastery of complex bodies of knowledge, and such mastery is often measured through students' abilities to transfer knowledge to applied settings. Mastery of knowledge and learning transfer occur when students can move beyond simply recalling information and are instead able to identify how knowledge can be utilized and when they develop the ability to apply said knowledge (Eyler, 2009).

Transfer of learning, which is especially important in the context of preparing individuals for vocational and professional settings, is heavily dependent upon the learning experience (Macaulay, 2000). Such an experience should be, "well taught and well-integrated with previous knowledge, [employ] teaching methods which seek to enhance the ability of students to make connections and [provide] ample scope for putting learning into practice" (Macaulay, 2000, p.

17). Over twenty years later, recommendations for enhancing experiential learning in AFNR contexts are continually being made (NASEM 2021). Recommendations have included examining how to best structure meaningful learning experiences in order to best prepare the AFNR workforce, encouraging the prompting of learner reflection around their experiences, and identifying which environments and designs are best suited for learning (Coleman et al., 2020; Coleman et al., 2021; NASEM, 2021). Therefore, this study will examine the effects of reflection mode and transfer level on students' transfer skills while learning experientially in an undergraduate AFNR course.

Theoretical Framework and Related Literature

Experiential learning theory was used as the framework for this study (Dewey; 1938; Joplin, 1981; Kolb, 1984, 2015; Roberts, 2006). Roberts (2006) claimed that many practitioners in agricultural education have studied the practice of experiential learning, but less attention has been paid to the theory behind the practice. Knobloch (2003) issued a challenge to educators, stating that we must “move beyond the ‘doing’ and ensure that all learning is connected to thinking and knowledge that will be easily remembered and applied later in life” (p. 31). For an experience to be educative, it requires more than concrete experience alone (Dewey, 1938; Knobloch, 2003; Kolb, 2015). Kolb (1984, 2015) purported that for a learning experience to be educative it must include four stages: (a) concrete experience, (b) reflective observation, (c) abstract conceptualization, and (d) active experimentation. The order in which the stages of the learning process occur can fluctuate (Kolb, 2015), and it is possible for stages of the process to occur simultaneously or at multiple points in the process. For example, reflection might occur during a concrete experience, after the experience, and again during the application stage. The interaction of these stages are of importance in framing this study, as we aim to examine the main and interaction effects of two stages, reflection and application, while learning experientially.

Reflection

Reflection is a critical learning process component for ensuring that learner's experiences are educative ones (Dewey, 1938; Kolb, 2015; Zull, 2002). Kolb (1984; 2015) labeled this stage of the experiential learning cycle reflective observation, which is the process of thinking about our experiences and examining them in our memory, in order to build mental connections between the concrete world and abstract thought. Zull (2002) claimed, “We need reflection to develop complexity. We may start with a direct and sometimes relatively simple concrete experience, but that experience grows richer as we allow our brain the freedom to search for those still unknown connections” (p. 164). And while reflection can occur subconsciously within a person's mind, it is also critical for the educator to prompt meaningful reflection within their students. It is up to the educator to design curricula and assignments that prompt reflection around essential, related concepts (Zull, 2002).

In agricultural education, researchers have tested the effects of Schön's (1983) two modes of reflection, reflection-in-action and reflection-on-action, while learning experientially (Baker et al., 2014, Blackburn et al., 2015; Coleman et al., 2020; Coleman et al., 2021; DiBenedetto et al., 2017). While these modes of reflection are widely recognized, they focus more on when reflection occurs as opposed to how reflection occurs. A reflection mode suggested by Wright et

al. (2013) called *hevruta* emphasized verbal discussion with a peer learner. The technique was used in two college courses, and it was successful in engaging participants in intellectual conversation and content comprehension around course topics (Wright et al., 2013). Another mode of reflection that has shown to be effective is written reflection, often in the form of portfolios or journals (Hubbs & Brand, 2005; Lamm et al., 2011; Loo & Thorpe, 2002; Thorpe, 2004; Yancey et al., 2013). Therefore, this study will test the effects of two modes of reflection, peer verbal and written journal, which will serve as the first independent variable.

Application via Transfer

Application, also known as active experimentation, is critical for effective experiential learning (Kolb, 2015; Roberts, 2006; Zull, 2002). Applying learned concepts to similar or new situations is known as knowledge transfer (Haskell, 2001; Macaulay, 2000). To accomplish this, learners must be able to implement their knowledge into real life practice (Macaulay, 2000). However, the role of the teacher is critical in educating learners on how to accomplish this. It is up to the educator to facilitate situations that challenge students and present them with problems so they may “take appropriate action based on the different sources of knowledge that they have accessed” (Macaulay, 2000, p. 18). Within institutional settings, using appropriate teaching methodologies, such as problem-based learning, simulations, case vignettes, or other reasoning strategies encourage the transferable elements and concepts of what learners have grasped to be brought into consciousness (Campione et al., 1995; Macaulay, 2000). Learners can then apply them to real-life situations “while being a step removed from a ‘messy’ reality where time is of the essence” (Macaulay, 2000, p. 18).

The contextual levels at which transfer can occur is also of importance. Macaulay (2000) outlined two broad levels of transfer, which included near and far transfer. Essentially, the difference between the two is transferring learned concepts to same or similar situations in which they were learned, versus transferring concepts to situations largely dissimilar in which they were learned. Haskell (2001) described a taxonomy of six levels of transfer: (a) nonspecific transfer, (b) application transfer, (c) context transfer, (d) near transfer, (e) far transfer, and (f) displacement or creative transfer. We merged the two theorists’ transfer levels into three categories, same, near, and far transfer. These three transfer levels will serve as the second independent variable of this study.

Transfer Skills

The ability to transfer learning is often considered the culmination, or overall objective, of learning. If one cannot transfer the learned abstract concepts to real life situations, then it can be argued that learning has not taken place (Zull, 2002). Haskell (2001) emphasized how important practice was when achieving transfer, stating, “Whether in the laboratory, in the classroom, or in natural settings, without sufficient practice enabling the adequate encoding of learning, transfer fails” (p. 175). Often, when a learner does not have the ability to transfer concepts and knowledge, it is because the time allocated for practice was overly brief (Haskell, 2001). The ability for a learner to achieve transfer is also dependent upon the type of practice they receive. Haskell (2001) purported that when learners process information across situations where stimulus-response are frequently changing, then far transfer is often achieved. However, automatic processing, the repetition of the same skill or concept application in the same setting,

often leads to near transfer achievement (Haskell, 2001). This is often the case in vocational settings, where learners are being trained for specific skills, instead of being educated holistically and being encouraged to be reflective in their practice. Such skill-repetition-focused settings are not conducive to building transfer skills (Haskell, 2001; Kemshall, 2000).

In addition to building transfer skills, educators must also consider how they might assess learners' transfer skills, which can be a difficult concept to measure (Cree, 2000). Cree (2000) outlined six characteristics that can serve as indicators of learning transfer: (a) being an active learner by seeking out knowledge, (b) reflecting on previous experience and knowledge, (c) making relevant connections between different experiences and sources of knowledge, (d) being flexible and able to compare critically, (e) using abstract principles appropriately, and (f) integrating personal knowledge and experience with professional knowledge and experience. Assessment methods by which an educator could potentially evaluate these six indicators include (a) observation of direct practice, (b) oral and written evidence, (c) learner self-assessment, (d) and feedback from clients or stakeholders (Cree, 2000). For this study, students' transfer skills will be the dependent variable, and will be measured using written evidence, as recommended by Cree (2000).

Purpose and Objectives

The purpose of this study was to examine the effects of reflection mode and transfer level on students' transfer skills over time in an undergraduate, animal science, laboratory course. This research was guided by three objectives:

1. Describe students' transfer skill scores over time as a function of reflection mode and transfer level.
2. Using statistical modeling, examine the effects of reflection mode, transfer level, and time in weeks on students' transfer skill scores.
3. Using model fit statistics, determine the best model for predicting students' transfer skill scores.

Methodology

Research Design

This research is part of a large-scale research project on the effects of experiential learning in a post-secondary agricultural education setting (Coleman, 2022). A 2x3 quasi-experimental design, examined with linear mixed modeling (LMM), was used for this research (Field, 2018; Singmann & Kellen, 2019). This 2x3 factorial design was utilized to test the main and interaction effects of two independent variables on one dependent variable over time (Terrell, 2012). The first independent variable was the method of reflection, which had two levels: written journal reflection or peer verbal reflection. The second independent variable was the level of transfer. This variable had three levels: (a) same transfer, (b) near transfer, or (c) far transfer. The dependent variable measured in this study included students' transfer skill scores. A pre-test score was also included as a predictor variable to control for students' prior knowledge.

Participants and Procedures

The population of interest for this study included post-secondary school students enrolled in undergraduate courses in colleges of agriculture. This experiment was conducted in the College of Agricultural and Life Sciences at the University of Florida which has a total enrollment of 4,101 undergraduate students. This quasi-experimental study employed a non-probability convenience sample in which students were enrolled in one of six pre-existing laboratory sections (Ary et al., 2010; Dooley, 2001). Specifically, the research was conducted with students enrolled in *ANS3006L: Introduction to Animal Science Laboratory* in the fall 2021 semester. This course was selected because it is a commonly taught, post-secondary, agricultural education course, and enough students enroll in this course each semester to have a large sample for conducting this type of research. Further, the course is laboratory focused, which is not only experiential in nature, but the laboratory sections also naturally divided students into six, equally distributed, physically separated groups which was beneficial for this research design. Students are allowed to enroll in this laboratory course if they have previously completed or are simultaneously enrolled in *ANS3006: Introduction to Animal Science*, which is the accompanying lecture course.

A total of 123 students were enrolled in the course. The course instructor informed students about the study, and students were offered extra credit and a gift card incentive for their participation. In total, all enrolled students ($N = 123$) agreed to participate in this study. Finally, we received permission from the Institutional Review Board (IRB), college administration, and course instructors, as well as consent from student participants, prior to conducting the research. The participants were 82% female ($n = 101$), 15% male ($n = 19$), and 2% non-binary ($n = 3$). A majority of participants were white ($n = 66$), 25% were Hispanic or Latino ($n = 31$), 12% were multiracial ($n = 15$), 6% were Asian ($n = 8$), and 2% were black ($n = 3$). Most of the participants ($n = 68$) had taken a previous post-secondary course related to animal science prior to this one. The six treatment groups were drawn from the six preexisting laboratory course sections. As such, selection bias was a recognized threat to internal validity, and was a limitation of this study (Ary et al., 2010). While the selection of participants was not completely randomized, the treatments were randomly assigned by the researchers to the six preexisting groups.

In addition to selection bias, there were 10 other threats to internal validity listed by Ary et al. (2010), all of which were controlled for by the design of this study. They were (a) history, (b) maturation, (c) testing, (d) instrumentation, (e) statistical regression, (f) experimental mortality or attrition, (g) selection-maturation interaction, (h) experimenter effect, (i) subject effect, and (j) diffusion. Over the course of the semester, no students dropped out of the study, and the average attendance for the course was 93%. Field notes that included researcher observations were recorded for most weeks to assist in controlling for any deviations from protocol that could have been a threat to validity. Over the course of 14 weeks, the six laboratory course sections met fact-to-face weekly for one hour and 55 minutes, which totaled 12 class meetings and two holiday weeks. Laboratory meetings were held from 12:50 p.m. to 2:45 p.m. and from 3:00 p.m. to 4:55 p.m., on Tuesdays, Wednesdays, and Thursdays, for a total of six separate laboratory sections each week.

In addition to the face-to-face lab meetings, students were expected to complete pre-lab assignments independently online before attending each weekly lab. The pre-lab assignments

focused on the development of students' abstract knowledge prior to attending the in-person, hands-on lab portion of the course. Pre-lab assignments included informational videos, PowerPoints©, and readings focused on the weekly topic. All experimental treatments were administered by the course instructors during the face-to-face class meetings. The same instructors taught all six sections of the course, so instructional delivery was consistent across treatment groups and instructor effect was controlled for.

For the independent variable of reflection mode, each lab answered up to five reflection questions, which were pre-developed by the course instructor and were aligned with the weekly topic and objectives. The reflection treatment was administered once weekly during 11 of the 12 weeks of instruction. The treatment was administered by the instructor during the face-to-face class meeting, and the treatment was also supervised by the researchers. All treatment groups were prompted with the same reflection questions, but the method by which the groups were prompted to reflect varied. Treatment groups A, B, and C were prompted to reflect via written journal reflection, while treatment groups D, E, and F were prompted to reflect via verbal peer reflection. Groups who were assigned written journal reflection were given a bound journal at the beginning of the semester. Students were given the reflection questions and asked to independently write their thoughts about each question in their journal. Groups who were assigned verbal peer reflection were given the reflection questions and asked to discuss them with a partner. Time allotted for reflection varied each week due to the varying number of reflection questions (approximately 7–10 minutes), but the same amount of time was allotted for reflection across treatment groups each week.

For the independent variable of transfer level, students were administered an exercise during their face-to-face class meetings. The exercises were developed by the researcher and course instructor and included a case vignette problem or situation in which students were to apply the animal science concepts being discussed during that week. Macaulay (2000) recommended the use of case studies or problem scenarios to facilitate transfer of learning. Students were broken into small groups and were asked to work through the vignette with their fellow group members. Treatment groups A and D received a vignette that prompted same transfer, groups B and E received a vignette that prompted near transfer, and groups C and F received a vignette that prompted far transfer. At the end of the exercise, instructors debriefed the entire class and clarified any questions the students had. The transfer level treatment was administered once weekly during eight of the 12 weeks of instruction.

Instrumentation

Course pre-test

As this is a junior-level, introductory animal science course, students who are enrolled typically come with an array of related experiences and existing knowledge about the course topics. Therefore, a pre-test was given before the first class meeting to assess students' prior knowledge, which met the assumption that the measure was collected before treatment was administered. The test was administered via the Canvas learning management system, which is used for all University of Florida courses; thus, students were familiar with this testing system. To assemble the pretest, all of the weekly, multiple-choice, quiz questions were compiled into a question bank. From there, 26 questions were randomly selected to be included in the pre-test. The face

and content validity of the pretest was evaluated by an expert panel consisting of two animal science faculty members, two agricultural education faculty members, and one doctoral graduate student of agricultural education. As a result, nine of the questions were adjusted for readability, grammar, spelling, and clarity. When preparing this data for analysis, group mean centering was utilized to assist in preventing multicollinearity between predictor variables (Field, 2018; Singer & Willett, 2003). Group mean centering allows the means of the continuous variable to be centered around a specific group's score. In the case of this study, the means of the prior knowledge scores were centered around the respective treatment groups' means.

Transfer skills assessment

Assessing transfer skills can be difficult to accomplish because it is influenced by a range of factors (Cree, 2000). Cree (2000) outlined four specific methods for assessing transfer skills, which included (a) assessment of direct observed practice, (b) assessment of oral and written evidence, (c) learner self-assessment, and (d) feedback from stakeholders. For the sake of this study, we opted to assess transfer using assessment of oral evidence in the form of written response questions over the course of the semester, which was also supported by Campione et al. (1995). The questions were developed to present real-world, problem-based scenarios related to the weekly course objectives. The questions prompted learners to transfer the objective-based concepts across three contextual settings (same, near, and far contexts), and all participants received the same questions. Face and content validity of the questions were examined by a panel of experts that included (a) two doctoral graduate students of agricultural education, (b) one faculty member of agricultural education, and (c) two animal science faculty members. Transfer assessment questions were administered via the Canvas learning management system as part of students' weekly quizzes, and they were administered during the same eight weeks in which the transfer level treatments were provided.

To score participants' transfer skills, a 12-point rubric was developed for evaluating the written responses. The following considerations for constructing rubrics recommended by Butler and McMunn (2006) were implemented: (a) the rubric reflects the skills and content taught; (b) the rubric emphasizes important concepts; (c) the rubric differentiates between superior, adequate, and substandard responses; and (d) the rubric designates the most important characteristics with appropriate point distributions. Additionally, the rubric criteria were developed based on Cree's (2000) six indicators of transfer of learning: (a) the learner is active in seeking out knowledge and learning, (b) the learner is reflective on their previous experience and knowledge, (c) the learner makes relevant connections between experiences and sources of knowledge, (d) the learner can compare and discriminate critically between concepts, (e) the learner uses abstract principles accurately, and (f) the learner integrates personal knowledge and experience with professional knowledge and experience.

In total, there were 951 written responses, transfer skill assessments submitted by the participants over the eight weeks in which assessments were provided. There were 33 assessments (3.3%) that were missing at random. Complete case analysis was used because the proportion of missing data was below five percent, which is negligible (Jakobsen et al., 2017). All assessments were scored by the lead researcher after interrater reliability was calculated. Interrater reliability was calculated using percent agreement among raters for a sample of the assessments (Dooley, 2001; Stemler, 2004). Acceptable levels of percent agreement for consistency estimates are those above

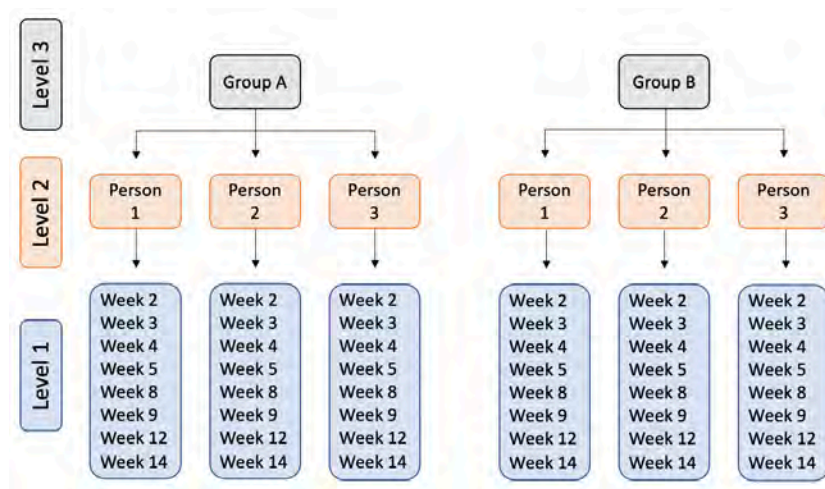
or equal to 70% (Stemler, 2004). To calculate the percent agreement, three assessments were randomly selected from each of the six treatment groups across the eight weeks of assessments, for a total of 144 assessments (15%), to be scored by two raters, both of whom were researchers on this study. Of the 144 assessments, 125 resulted in exact agreements for a percent agreement of 86.8%. Of the 19 scores that were not exact agreements, all were near-miss adjacencies (off by only one point). To resolve the differences, the two raters met to discuss the adjacencies which provided additional clarity around the use of the scoring rubric.

Data Analysis

All data were analyzed with SPSS Version 28. An LMM procedure was conducted for this three-level data structure (Field, 2018; Singer & Willett, 2003; Singmann & Kellen, 2019). The LMM procedure was selected because it is appropriate for experimental design studies that include repeated measures (Singmann & Kellen, 2019), and assumptions of independence and homogeneity are met as a function of the procedure (Fitzmaurice & Ravichandran, 2008). The restricted maximum likelihood (REML) method was used for estimating model parameters. Figure 1 is a visual display of the three levels: (a) level 1, representing each of the 8 weeks in which a measure for transfer skills were observed; (b) level two, each participant within the study; and (c) level 3, each of the six treatment groups (A–F).

Figure 1

Three-level Linear Mixed Model Design Structure



However, upon initial analysis of the data, the level three parameter accounted for a marginal amount of the variance of the transfer skill scores in the model (0.04%), so level three was removed from final analysis. The between-subjects variance as a function of the intraclass correlation coefficient (ICC) was .377 for Model One. In total, seven models were examined in order to examine the effects of all predictor variables (time, the experimental independent variables, and the variable of prior knowledge) on transfer skill quiz scores. The starting model included only the fixed effect of time, while the remaining predictor variables were included one at a time to compare model fit statistics between models. However, only estimates from three models are reported in this study. They include (a) Model One, our beginning model that

included the fixed effect of time (in weeks) on transfer skill scores; (b) Model Two, the model that included all predictor variables, which were the fixed effects of time (in weeks), prior knowledge, reflection mode, transfer type, the interaction of reflection mode and transfer type, and the interaction of time and transfer type on transfer skill scores; and (c) Model Three, the final model which included the fixed effects of time and transfer level on transfer skill scores.

Results

Means and standard deviations for students' transfer skills scores across the eight observations (which spanned 12 weeks), categorized by treatment group and total scores, are reported in Table 1. For the total scores of all participants, the two highest mean scores were observed in weeks 12 and 14, and the two lowest mean scores were in weeks two and four. For Treatment Group A (same transfer, written reflection), the two highest mean scores were in weeks nine and 14, and the two lowest scores were in weeks four and eight. For Treatment Group D (same transfer, verbal reflection), the two highest mean scores were in weeks eight and 14, and the two lowest mean scores were in weeks four and five.

Table 1

Transfer Skill Score Means and Standard Deviations by Treatment Group

Week	Group A		Group B		Group C		Group D		Group E		Group F	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
2	8.15	1.87	7.45	1.50	8.25	2.22	8.24	1.79	7.95	1.83	8.47	2.39
3	8.71	2.05	8.80	2.24	8.20	1.94	8.67	1.62	8.43	2.01	8.89	1.73
4	6.48	1.99	7.43	1.91	8.25	2.27	8.10	1.71	7.55	1.36	9.32	1.53
5	8.30	1.95	7.45	1.67	8.45	1.61	8.10	1.87	7.67	1.56	8.89	1.85
8	7.48	1.94	8.42	1.61	8.37	2.31	8.71	1.59	7.60	2.04	8.74	2.05
9	8.95	1.79	8.48	1.69	8.47	2.17	8.65	1.57	8.20	1.47	8.79	1.40
12	8.70	1.34	9.16	1.54	9.50	1.65	8.65	1.69	7.95	1.96	9.22	1.52
14	9.33	2.11	9.85	1.42	9.74	1.85	8.78	1.83	9.15	1.87	9.11	1.60

In Treatment Group B (near transfer, written reflection), the two highest mean scores were in weeks 12 and 14, and the two lowest mean scores were in weeks two, four and five, with weeks two and five being the same. For Treatment Group E (near transfer, verbal reflection), the two highest mean scores were in weeks three and 14, and the two lowest means scores were in weeks four and eight. In Treatment Group C (far transfer, written reflection), the two highest mean scores were in weeks 12 and 14, and the two lowest mean scores were in weeks two, three, and four, with weeks two and four being the same. Finally, in Treatment Group F (far transfer, verbal reflection), the two highest mean scores were in weeks 12 and 14, and the two lowest mean scores were in weeks two and eight. For the most part, the highest scores were observed within the latter portion of the semester, and the lowest scores were within the beginning or middle of the semester. Results from the LMM procedure are presented in Tables 2, 3, and 4.

Model One included a positive, significant ($p < .001$) fixed effect of time (in weeks) on participants' transfer skill scores. When examining Model Two, which included all variables of interest as fixed effects, time (in weeks) had a positive, significant ($p < .001$) effect on participants' transfer skill quiz scores. Additionally, the fixed effect of near transfer had a negative, significant ($p < .05$) effect on participants' transfer skills scores as compared to the fixed effect of far transfer. All remaining fixed effects, including prior knowledge, reflection mode, the interaction of reflection mode, and the interaction of time and transfer level, has no significant effect on students' transfer skills scores. Therefore, Model Three retained only the positive, significant ($p < .001$), fixed effect of time (in weeks) and the fixed effect of transfer level on students' transfer skills scores. The categorical predictor variable of transfer level included a nonsignificant, negative effect of same transfer when compared to far transfer and a significant ($p < .05$) negative effect of near transfer when compared to far transfer. Model Three, as indicated by the AIC and BIC measurements (Table 3), was the most parsimonious model.

Table 2
Estimates of Fixed Effects for Predictor Variables Across Three Models

Fixed Effect	Model 1	Model 2	Model 3
Intercept	7.80***	8.40***	8.14***
Time (in Weeks)	0.09***	0.07***	0.09***
Pre-Test (Prior Knowledge)		-0.05	
Written Reflection (with Verbal Reflection as a Reference)		-0.31	
Same Transfer (with Far Transfer as a Reference)		-0.46	-0.41
Near Transfer (with Far Transfer as a Reference)		-1.17*	-0.57*
Written Reflection*Same Transfer		0.05	
Written Reflection*Near Transfer		0.60	
Time (in Weeks)*Same Transfer		0.00	
Time (in Weeks)*Near Transfer		0.04	

Note. Significant at * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3
Statistics of Model Fit across Three Models

Model Fit Statistic	Model 1	Model 2	Model 3
-2 Restricted Log Likelihood	3655.42	3662.54	3652.70
Akaike Information Criterion (AIC)	3659.42	3666.54	3656.70
Bayesian Information Criterion (BIC)	3669.13	3676.23	3666.41

Table 4
Variance Components across Three Models

Variance Component	Model 1	Model 2	Model 3
Residual Variance (Within Students over Time)	2.17***	2.16***	2.17***
Intercept*Student Covariance (Between Students)	1.31***	1.29***	1.28***
Percent Reduction of Between-Subjects Variance		1.80	2.41

Note. Significant at * $p < .05$, ** $p < .01$, *** $p < .001$

Conclusions, Implications, and Recommendations

The positive, significant trend for the fixed factor of time (in weeks) indicates that growth in students' transfer skills increased as the semester progressed, and this was irrespective of the experimental treatment group to which participants were assigned. This finding is congruent with Haskell's (2001) consideration that time spent practicing transfer skills is critical for skill development. The more time students spend interacting with course content, and the more time they spend practicing transfer skills, the more expertise is developed, and the ability to transfer concepts to real-life settings increases (Haskell, 2001; Macaulay, 2000).

However, for those aiming to build transfer skills within their learners, we emphasize that time alone is likely not enough to develop transfer skills. Transfer skill practice should be met with deliberate, learner self-reflection around the act of practicing transfer skills (Campione, 1995; Haskell, 2000; Macaulay, 2000). It is noted that in this study, reflection mode was not a significant predictor of students' transfer skill scores. However, when developing transfer skills, it may be less important to focus on the method of reflection, and more important to focus on the topic of reflection. For example, researchers have emphasized learner self-reflection, but in a metacognitive way that encourages learners to think deeply about the practice of transferring skills (Campione, 1995; Haskell, 2000; Macaulay, 2000). Learners need to know why they are applying concepts, and they need to critically examine their own performance and reasoning. In this study, learners were prompted to reflect around the course content as it related to the weekly course objectives, and reflection was not metacognitively focused. Therefore, we recommend that practitioners seeking to build transfer skills offer opportunities for metacognition and critical self-reflection around their own thinking and practice, in addition to content-based reflections. Both written and verbal methods of reflection are supported by research theorists (Blackburn et al., 2015; Hubbs & Brand, 2005; Lamm et al., 2011; Loo & Thorpe, 2002; Thorpe, 2004; Wright et al., 2013; Yancey et al., 2013), and our findings suggest neither method is more effective than the other when controlling for transfer skill scores. Further, it is recommended that future research around teaching for transfer skills investigates the effects of both metacognition and content reflection practices.

The interaction effect of reflection mode and transfer level was not significant, indicating that these two independent variables were independent of one another when controlling for transfer skill scores. Additionally, the interaction effect of time (in weeks) and transfer level was not significant, suggesting that these two variables are also independent of one another when

predicting transfer skill scores. However, when analyzing the independent variable of transfer level, near transfer has a negative, significant effect when referenced against far transfer, suggesting that learners who were in far transfer groups would achieve higher transfer skill scores. This overall pattern suggests far transfer might be more effective and should be further explored. Additionally, Macaulay (2000) described only two levels of transfer, which were near and far. We also recognize that same and near transfer levels are contextually similar. As a result of the difference between near and far transfer had in this study, future research could combine the same and near transfer levels and test the difference between two levels: same/near transfer versus far transfer.

It is important to consider that, in this study, learners treated with far transfer were prompted to work through three case vignettes. They did not jump straight to far transfer. Instead, a scaffolding approach was used, starting with a same context transfer scenario, moving to near context transfer, and finally to a far context scenario. In this approach, far transfer groups received more practice with using transfer skills in class than other groups. As we previously mentioned, practice is essential when developing learners' transfer skills (Campione et al, 1995; Haskell, 2001; Macaulay, 2000). We recommend that practitioners consider utilizing the approach of scaffolding learners to a more distant context when teaching for transfer. Lastly, while the far transfer group was more effective compared to near transfer groups, we want to highlight some considerations by Haskell (2001) that are important to consider for researchers who are interested in measuring transfer skills. Caution should be used when designing experiments which measure transfer skills, because:

teaching the principle in such close association with testing for transfer is not much different from actually telling subjects that they should use the principle just taught [to] them. And telling a subject to use a principle is not transfer. It's simply following instructions. (Haskell, 2001, p. 37)

Therefore, the dilemma is not that learners are taught transfer skills, but that measurement of transfer skills is tricky. When explicitly asked to transfer concepts for the sake of assessment, transfer is not autonomous nor is it initiated by the learner, which some may argue is not true transfer (Haskell, 2001). We transparently present this dilemma, not to discount our findings. Rather, consumers of this research, and those seeking to measure transfer skills experimentally or practically, should be informed of its complexity and measurement challenges.

It was observed that the final model we fitted was the most parsimonious; however, it resulted in fairly low measures for between-subjects variances. As such, it is recommended that this study be replicated. Continual study around these phenomena would provide longitudinal effects, which could be helpful in confirming the findings of this study. Additionally, the inclusion of within student characteristics as predictor variables, such as race/ethnicity, sex, academic major, etc., may also aid in accounting for some of the remaining variance. For those who aim to teach for transfer, it is critical that real-life, practical experiences are included (Cree, 2000; Macaulay, 2000; Haskell, 2001). In this study, we utilized realistic, scenario-based case vignettes as the treatment, which also served as one method of simulating reality. However, the laboratory course was also designed to include practical animal science experiences, coupled with the other critical experiential learning components of reflection, conceptualization, and application that are recommended by theorists (Dewey, 1938; Joplin, 1981; Kolb, 2015; Roberts, 2006). Experiential

learning, when implemented holistically, lends itself naturally to knowledge transfer (Macaulay, 2001; Zull, 2002), especially at the post-secondary level (Estepp & Roberts, 2011; Eyler, 2009; NASEM, 2021). Thus, we recommend its use for practitioners interested in developing transfer skills within their learners. However, it is not enough to only provide real-world experiences. When designed with intentionality and holisticness, which marries experience with critical reflection, abstract conceptualization, and practical application, experiential learning has the power to provide educative experiences for learners, and to achieve the end goal of education: knowledge transfer.

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Driving Feedback Home: A Hermeneutic Phenomenology of Feedback Patterns Between University Supervisors and Teacher Candidates

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Abstract

Feedback is powerful and foundational to the on-going professional and personal development of teacher candidates, yet few investigations relating to the experiences of supervisors of teacher candidates in school-based agricultural education (SBAE) programs exist. In response, this study explored the patterns of feedback that surface from both the perceptions and experiences of university supervisors (n = 6) while engaging with SBAE teacher candidates. Semi-structured interviews, observation, and personal reflection guided the data collection for this hermeneutic phenomenology with supervisors to devise a potential structure that reflects the overall pattern of feedback delivery. Three themes were generated from the data corpus: (1) Fueling the Engine, (2) Reading Road Signs, (3) Shifting Gears. These themes embody what it means for these supervisors to drive feedback home. Supervisors from this study, unlike prior literature, especially emphasized the role of emotions on the process. Ultimately, these supervisors see the value in on-going evaluation of the relationship and emotional state of the teacher candidate so they can adapt and ensure learning is happening. Implications for SBAE teacher educators exploring the interplay of feedback, emotionality and a potential structure are discussed. A thematic map provided an image for how to conceptualize these strategies, yet remains untested.

Introduction/Theoretical Framework

University supervisors in teacher education programs are critical to the success of teaching and learning in K-12 settings. Nolan and Hoover (2004) supported this claim, and contended that the university supervisor's role is to "promote teacher growth which leads to improvement in teaching performance and increasing student learning" (p.26). Supervisors support the growth and development of teacher candidates in several ways, and scholars have identified one particular role to be perhaps the most influential: providing feedback (Ellis & Loughland, 2017; Hattie & Timperley, 2007; Sikula 1996). In the simplest definition, feedback is information. Feedback is utilized in many professional settings, and Hattie & Timperley (2007) clearly defined that in educational settings, feedback is "information provided by an agent regarding aspects of one's performance or understanding" (p.81). In the context of teacher education, we can draw a connection to the agent role being fulfilled by supervisors.

The overarching purpose of feedback is powerful and can be a linchpin for improving learning performance (Hattie & Timperley, 2007). A common theme observed in the agricultural education literature is that feedback is in high demand and highly valued (Dinsberger et al., 2022; Rubenstein & Thoron, 2013; Wolfe et al., 2010). Feedback is not only valued, but it is "influential on the quality of field experience" that all teacher candidates must complete before entering the profession (Shoulders et al., 2016, p. 161). At the same time, feedback can be powerful in ways to fail the student if not delivered effectively or consistently (Hattie & Timperley, 2007), and this is particularly salient for the development of teacher candidates (Ellis

& Loughland, 2017; Hudson, 2013). The process of feedback and “the way it is given is differentially effective” (Hattie & Timperley, 2007, p.81). Scholars continue to raise questions of uncertainty on *how* this process actually works (Sikula, 1996) and *if* the supervisors' practices of feedback work (Darling-Hammon & Bransford, 2007). Given the gravity of both the role of a supervisor, and the influence of feedback on teacher candidate growth (Nolan & Hoover, 2004), self-efficacy (Gall & Acheson, 2010), and instructional performance (Hattie & Timperley, 2007), it is all the more confounding that direct observation of this process has received scarce attention in agricultural education scholarship (Fritz & Miller, 2004; Rubenstein & Thoron, 2013).

Social constructivist theory is the underlying theoretical framework for this study. Vygotsky (1934) suggested language and the social interactions with language are key to the production of knowledge and learning. The social constructivist theory implies action between two or more individuals, which is akin to the dyad suggested in Hattie’s & Timperley’s definition of feedback (2007). Viewing feedback as an interactive process affords exploration of the phenomena as more than descriptive information, but also an interplay of information between supervisors and teacher candidates that is characterized by other features.

Purpose

This study explored the structures and patterns related to feedback delivery among supervisors of teacher candidates using hermeneutic phenomenology. The existing background of knowledge of how feedback occurred between supervisors and teacher candidates lead to a primary research question for exploration: What patterns of feedback arise from the perceptions and experiences of SBAE university supervisors working with teacher candidates, and is there a common structure?

Methods

A constructivist approach was most appropriate for this inquiry due to the interpretive and highly subjective nature of phenomenology (Creswell & Poth, 2018). Further, because multiple participants’ lived experiences were shared through this study, multiple truths and perspectives were valued to help construct the historical significance and meaning of the phenomenon (Creswell & Poth, 2018; Lavery, 2003). Through a constructivist lens, knowledge is viewed as relative and in constant emergence across the inquiry process between the researcher and participants (Guba & Lincoln, 1994), which is useful when engaging with phenomenological inquiry. Specifically, hermeneutic phenomenology was a suitable methodology for this study because of the active participation of the lead researcher in the feedback process, and this decision afforded a higher degree of self-reflection to be integrated and interpreted (Lavery, 2003). In the end, this allowed the addition of researcher experiences and imagination in the construction of meaning (Groenewald, 2004).

Sampling and Population

Purposive sampling was leveraged as the best strategy for deciding which participants would be solicited for the study (Marshall et al., 2022). The current affiliation with the university and existing role of the lead researcher as a university supervisor made building trust and relationships with participants a far more rapid process than what could be accomplished

elsewhere (Marshall et al., 2022). At the same time, the highly relevant experiences of potential participants within the department of this specific site provided the ideal purposive sample for the study (Marshall et al., 2022; Maxwell, 2005). The criterion for inclusion in the study was that the individuals must currently be employed by a land-grant serving institution in Oregon, and have experience providing feedback to teacher candidates in SBAE in a university supervisory role including but not limited to: working in teacher education, serving as a cooperating teacher for a teacher candidate in the field, or conducting on-site evaluations of teacher candidates. A summary of participants including pseudonyms and a brief description are included in Table 1.

Table 1
Summary of SBAE Supervisors for Study

Pseudonym	Supervising Experiences
Carson	Associate Professor, Department Head. Formal experiences originated during graduate school. Seventeen years total experience.
Shannon	Assistant Professor. Formal experiences originated during graduate school to assist with supervision. Primarily supervises and provides feedback through instruction for the last three years.
Mandi	Instructor. Conducted informal observations of teacher candidates during the first year of current position, and now is in a formal supervision role. Two years of experience.
Heather	PhD Student. Formal experience originates as a cooperating teacher for six SBAE teacher candidates. This is their first year in a supervising role.
Trey	Assistant Professor, Director of Teacher Education. Formal experiences originate from serving as a cooperating teacher for eight SBAE preservice teachers. Eight years in current role supervising teacher candidates.
*Kirby	PhD Student. Eight years in SBAE teaching, including being a cooperating teacher for preservice teachers. First year in university supervising role.

Note. Pseudonyms were assigned after initial transcription of data to protect privacy. *Lead Researcher

Data Collection

Data collection occurred in two phases: in-depth interviews, and participant observation. Consistent with the traditions of phenomenology, in-depth interviews were the primary method for participants to share their lived experiences providing feedback to teacher candidates (Marshall et al., 2022). An interview protocol with six open-ended questions, grounded in research and previous literature, was developed to understand the supervisors' experiences with feedback (Creswell & Poth, 2018). Questions asked of participants included:

1. How would you describe your experiences providing feedback to SBAE teacher candidates?
2. What is feedback? How do you define *feedback*?
3. What do you believe about giving feedback to SBAE teacher candidates?
4. What is a strategy you find most effective in providing feedback to SBAE teacher candidates?

5. What else would you like me to know that I haven't asked you about related to the topic of feedback?

Additionally, two participant observations were conducted at the site of a high school with a supervisor while they were actively providing feedback to a teacher candidate, and I, as the lead researcher, actively engaged as well (Spradley, 1980). Reflective memos were written following each interview and at the conclusion of each observation (Marshall et al, 2022).

Data Analysis

The lived experiences of the participants were interpreted and socially constructed through an analysis of interviews and observations. The ongoing challenge was to best capture the verisimilitude of each individual experience as well as the collection of experiences in relation to the overall pattern of feedback (Creswell & Poth, 2018; Fusch et al., 2018). Zeroing in on the unit of analysis (experience and perceptions of feedback of participants) was achieved via an iterative process of coding. In vivo coding, axial coding, memoing, and thematic mapping were foundational for a within method crystallization of analysis (Fusch et al., 2018; Marshall et al., 2022). A “thinking with theory” mindset provided a sense of focus for the coding scheme and analysis procedures (St. Pierre & Jackson, 2014, p.717), and these interpretations were organized with NVivo software.

Rigor, Credibility, and Integrity

Rigor was obtained through the sample size and ongoing analysis and memoing processes, but also through final verification of the thematic map. Overall data saturation was the prime objective through thorough data collection, field notes, and the regular upkeep of memoing by the lead researcher (Lareau, 2021). Data saturation and crystallization are evidence of building credibility (Cian, 2021). In addition, the integrity of this study was achieved through a constructivist paradigm so as to avoid any attempts to oversimplify or generalize stories, but instead point out the very unique context shaping each experience of the SBAE university supervisors (Guba & Lincoln, 1994).

To further address credibility and integrity, as the lead researcher I acknowledged my own personal history (Denzin & Lincoln, 1994) which influenced my positionality and bias before, during, and after data analysis (Arendell, 1997). I was a 7-12 agriculture teacher, which provided me with a context to better understand the language of SBAE as it relates to feedback (Berger, 2015), and my beliefs about feedback affected the ways in which I conveyed meaning through the participants' own stories (Creswell & Poth, 2018; Laverty, 2003). While I have served in a limited capacity as university supervisor for the last three years, my (in)experiences with the supervision of teacher candidates gave me a unique perspective to embrace a beginner's mind for both listening to and observing feedback through the participants' eyes and my own. Overall, I acknowledge that my own relationship with SBAE, beliefs about effective teaching practices, and effective feedback characteristics will affect the ways in which I interpret and convey meaning through the participants' own stories (Creswell & Poth, 2018; Laverty, 2021). I followed up with two of the participants during data analysis to gain their insights on the final themes I created to ensure this representation embodied the essence of their experiences.

Findings

The overall essence of this study is that the experience of feedback in school-based agricultural education (SBAE) is constructed socially and emotionally between university supervisors and teacher candidates to support the self-efficacy of teaching performance and understanding. I, as the lead researcher, re-imagined this through a metaphor of driving on a highway, where both the SBAE teacher candidate and university supervisor are sharing the same vehicle with a desired destination. The essence is to drive feedback home, where the university supervisor and teacher candidate work together to reach a destination that is new territory, and one that the teacher candidate can claim as home. The phrase, “driving feedback home” is a nod also to the ongoing repetition and reinforcement in order for good teaching practices and changes to stick. The university supervisor and teacher candidate are continuously engaged in feedback to, essentially, fuel the engine of the vehicle forward. This co-constructed interplay is fueled by dialogue, constructive information, and reflective questioning. The ways in which this forward movement is approached are dependent upon the emotions which surface during a feedback experience. These features serve as road signs and signals for how the university supervisors adjust and attend to their relationship, insert positivity, or manage the emotional state of the teacher candidate.

Ultimately, the university supervisor desires for the teacher candidate to be able to read the road ahead, shift gears, and feel confident in the driver's seat. University supervisors hope to achieve this through reinforcement, especially positive components of the teacher's performance, as well as through reflective questioning to subsequently spark an aha moment where the teacher candidate arrives at their own conclusion. The three predominant themes I determined as salient to this overarching theme are as follows: (1) *Fueling the Engine*, (2) *Reading the Road Signs*, and (3) *Shifting Gears*.

THEME I: *Fueling the Engine*

SBAE university supervisors believe feedback should be a co-constructed experience. Central to this theme are three characteristics rooted in the experiences of participants and theory. First of all, the meaning-making of feedback is dialogic. This means multiple perspectives are part of a socially constructed experience, including the university supervisor, teacher candidate, cooperating teacher, and at times administrators and classroom students. Dialogue occurs between two individuals, and when participants described the experience of feedback as a back-and-forth conversation, this demonstrated evidence of how dialogue was key to co-construction. Mandi (Instructor, 2 years' experience) highlighted the importance of dialogue, and likes to start their own feedback by “letting them speak first.” Additionally, for Mandi, providing descriptive feedback in a dialogic manner allows for a deeper understanding of the teaching performance from the teacher candidates perspective and when the university supervisor notices classroom dynamics that appear chaotic,

...they (teacher candidates) have the opportunity to say, ‘I’m okay with a little chaos.’ Just hearing them explain what they did, gives me as an observer, a little context of what they are thinking about and why they are doing things a certain way. – Mandi, Interview, February 2, 2022

The second feature of co-construction is achieved through features that are descriptive in nature, and work towards improvement, or what education scholars would call constructive

(Brookhart & Moss, 2015; Ellis & Loughland, 2017; Hattie & Timperley, 2007; Hudson, 2013). Often constructive experiences in feedback, when described by participants, were made in groups of two or three statements at the conclusion of their meeting as a summary of what needs to be worked on in the future. Trey and I (Observation, February 14, 2022) used the phrase “I noticed” frequently when providing constructive feedback, and Heather (Interview, February 4, 2022) tells teacher candidates, “This is what I’m seeing.” Trey believes that making objective statements allows an opportunity for the teacher candidate to respond, which is further evidence of dialogue, and it “feels like a productive conversation, because they then can use it.” Heather agrees with this tactic because “maybe I’m completely off” and acknowledges a more co-constructive experience can be found when criticism is shared and responded to. Personally, I chose to use this phrase of noticing to maintain a highly objective presence and reduce the overall volume of content shared.

The third feature consists of how the processes of asking questions, assessing what happened, and making connections between these concepts yield reflection. When defining feedback, Carson (Associate Professor, 17 years’ experience), even avoided using “feedback”, and instead offered “reflective time” as an alternative. The types of questions asked by university supervisors range across the taxonomy of learning. Some questions are more grounded in recall and understanding, where others push for more analysis and application. The questioning process is interconnected with self-realization, where reflection often afforded teacher candidates an opportunity to arrive at conclusions on their own. Shannon (Assistant Professor, three years’ experience) tries to “get the teacher candidates to notice something before making corrections”. Carson mentioned how they posit reflective questioning to reach realization and what a powerful experience it is to witness the teacher candidates come to an understanding on their own. Altogether, these features are fuel for the engine which will drive both the feedback process forward as well as the teacher candidates own understanding of their teaching performance.

THEME II: *Reading Road Signs*

SBAE university supervisors attend to the emotionality of feedback because of the personal impact it can have on teacher candidates. The pattern of experiences noted across participants suggested a deeply personal element to the reception of feedback, and the importance of noticing when to adjust the delivery. Reading road signs is salient to the experiences of university supervisors because they care for the wellbeing of teacher candidates and support their self-efficacy. Prior to the feedback process, university supervisors emphasized the importance of assessing their own relationship with the teacher candidate and how this impacts how they proceed with feedback. Carson shared that, due to his growing list of responsibilities, he spends less time with each cohort of teacher candidates and this impacts the “deeper relationship”, impacting the rigor of questions he asks. Carson noted how this relates to building up the self-efficacy of the teacher candidate,

And then you’ll temper those with at least the same number of positives if not more and try to build their self-confidence. They are in an interesting spot of their career because self-confidence is an area that they lack, so I think they are really sensitive to observations. I feel like, if I’m going to employ a tactic where I list a lot of questions, I got to make sure at the end that I lift them up, let them know that they are doing well, that I care about them... – Carson, Interview January 27, 2022

Part of this is ensuring that the teacher candidate trusts the university supervisor's insights are coming from a place of care, and without trust some of the feedback may never be completely received or implemented.

Additionally, university supervisors scan for the emotions of teacher candidates as embodied in both their non-verbal and verbal expressions, which is evidence of emotional intelligence. According to Trey, awareness of the teacher candidates' emotional state works alongside another important skill for actually managing their emotional responses, especially when a "hard conversation" is necessary. These participants agree that it is important to take note of the teacher candidate's emotions and be able to regulate their feedback to attend to their emotional wellbeing. Participants also agreed that a teacher candidate may not receive feedback in the way intended because their brains are defensive and therefore not capable of engaging in critical thinking.

Similar to relationships, absent emotional intelligence, university supervisors believe that the feedback process can be greatly impeded. However, this is still dissimilar because a university supervisor can still attend to the emotional needs of a teacher candidate even if they are less familiar with them from a personal level. Metaphorically speaking, we can see these as a road sign that indicates it's time to slow down or pull over. A sign might even manifest as a check engine light, or low fuel; without a properly running engine or necessary fuel the desire to drive home a point is not possible. Carson underscored this theme by stating, when the emotional fuel is low for a teacher candidate, "I've lost some of the ability to process in an objective way."

Lastly, all university supervisors in this study agreed that the inclusion of positivity was fundamental to attending to the emotional and personal elements of feedback. In particular, positive language and praise are woven into the feedback experience because these participants believe that there is always something that can be commended. Moreover, acknowledging the strengths of a teacher candidate is essential to positivity because this gives them a reference point not only of what they are good at, but also that it is noticed by their university supervisor. Positivity works in tandem with reinforcement so teacher candidates are more likely to repeat actions that will help them be more successful teachers in the future. Positivity is a way to overcome some of the more emotionally sensitive aspects of feedback and is integral to reading road signs.

THEME III: *Shifting Gears*

In the end, SBAE university supervisors in this study want teacher candidates to take ownership of their learning and overall progress to becoming a more skillful, professional teacher in the field of SBAE, which resonates with the final theme of "Shifting Gears". To achieve this, two patterns related to reinforcement of the university supervisor's perspective and the self-realization of the teacher candidate are necessary. Reinforcement begins with the perspective of the university supervisor. These supervisors want their teacher candidates and future colleagues to be successful, and they recognize the importance of their experience, perspective, and position. The group of university supervisors each had their own way of describing this process. Heather spoke with passion about their goals for feedback including the future outcome of the teacher candidate, "I think my job is to guide them to be the best kind of

ag teachers that I think they can be.” These supervisors will make objective statements to affirm what they saw in the teaching performance from their perspective with the goal of this matching the reality of the teacher candidate’s own perception of what happened. Trey described his goal of reinforcing the positive aspects of a teacher candidate’s understanding of teaching with the goal of increasing the frequency of desirable skills. When teacher candidates reflect on their own teaching, university supervisors find power in agreeing when relevant or encouraging them.

In addition to reinforcement, self-realization achieved by the teacher candidate is a specific goal of these university supervisors. In fact, this point was driven home by all participants in multiple ways to represent where teacher candidates noticed their own performance and analyzed it in a way to make use of it in the future. Arriving at self-realization is a by-product of reflective questioning and is not always the easiest and something teachers “wrestle with”, but that is part of the craft of providing feedback. Through the questioning and inner struggle, teacher candidates “get to what I was gonna say anyway” (Shannon), and this noticing “shows a deeper understanding of what they are actually doing” (Mandi). These supervisors want their teacher candidates to arrive at self-realization because “on their own, they are more willing to embrace it and hone it.” (Carson).

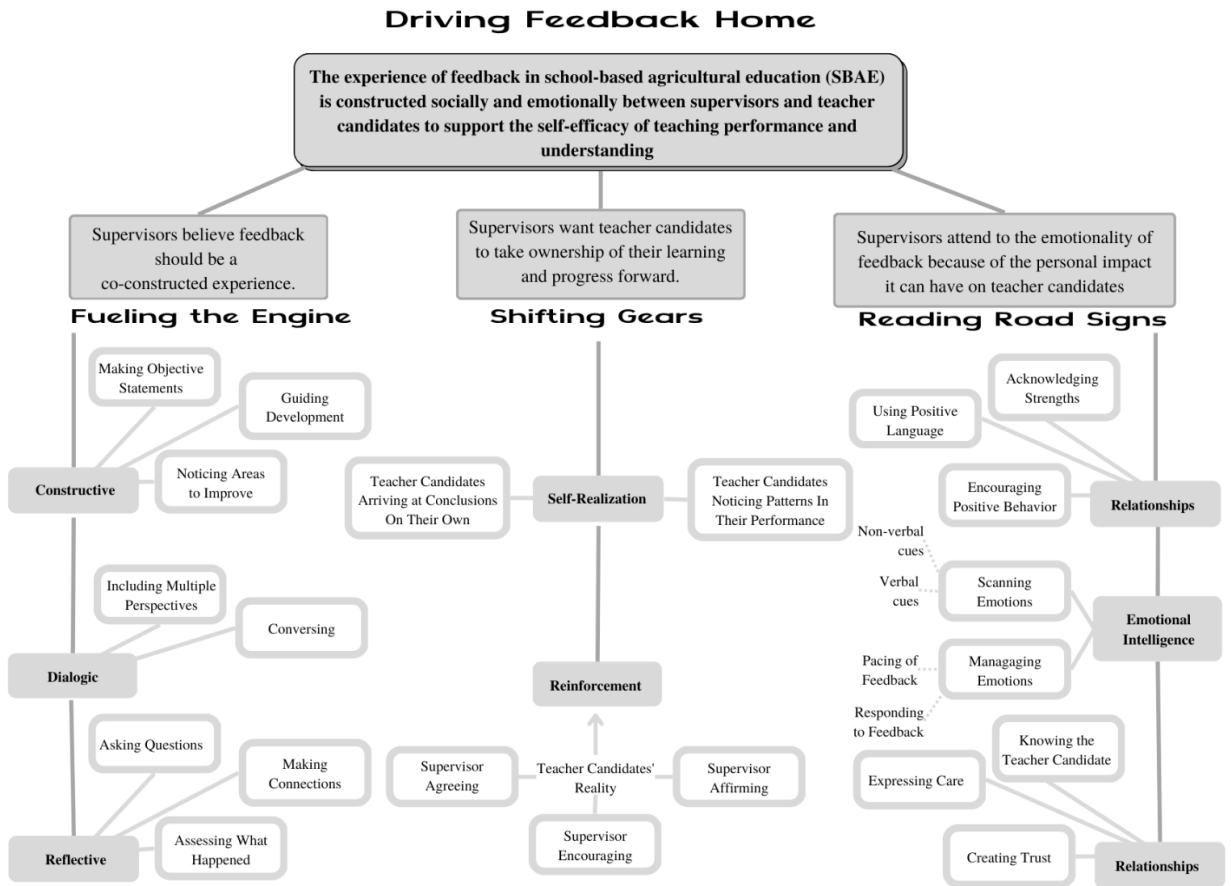
And then at the end of the feedback trying to get them to weigh in on ‘What do you think you can do to improve on?’ Especially if they notice themselves. Actually, taking time with them to come up with some steps that they can take. –Mandi, Interview, February 2

Reinforcement and encouragement go beyond the content of the feedback and teaching performance itself, and Heather demonstrated a potential relationship between the emotional aspect of feedback. Heather believes in reinforcing the challenges of teaching and empathizing with teacher candidates to encourage growth. Together, reinforcement and realization are pivotal to the future teaching performance of the teacher candidates, and these participants utilize tactics to demonstrate both. They believe the summary of their feedback experience will be more powerful if the students come to a conclusion on their own and the supervisor supports them. This pattern of strategies leads to a shift being made by the teacher candidate through their own self-efficacy.

Overall Finding

These university supervisors do see their feedback experience to be informed by both social dynamics of their conversation as well as the emotionality of teaching. As a result, they utilize inclusive language that suggests a team effort, or co-constructed component to the overall development of the teacher candidate. *Reading the Road Signs* occurs by acknowledging the positive and negative affect around feedback, (2) *Fueling the Engine* happens through constructive statements, and (3) the language of the university supervisor to the teacher candidate reinforces a desire for *Shifting Gears*. These supervisors acknowledge the overall desire for cultivating the self-efficacy of teaching performance and understanding and that the self-realization of the teacher candidates’ learning, is a process that requires time and practice. Figure 1, on the following page, illustrates the interconnectedness of the themes and sub-themes in the form of a thematic map.

Figure 1.
Thematic Map Representing SBAE Supervisor Feedback Themes



Note. The following thematic map is organized in a hierarchy to represent theme and sub-theme relationships according to Braun & Clark (2006).

Conclusions and Recommendations

The findings of this study are illustrative of the socially constructed aspect of feedback and the meaning-making achieved by both university supervisors and teacher candidates. The objective was to interpret the patterns of feedback that arise from the perceptions and experiences of SBAE supervisors providing feedback to teacher candidates. Findings indicate that (1) *Reading Road Signs*, (2) *Fueling the Engine*, and (3) *Shifting Gears*, are representative patterns, and suggestions of a structure for providing feedback that aligns with the way Hattie and Timperley (2007) described feedback in educational settings. These themes point out that feedback is mediated through emotions, dialogue, and the interconnectedness of reinforcement and realization, all of which work in concert to drive feedback home.

One of the research questions in this study aimed to determine how these patterns in feedback might suggest a potential structure of delivery, noted in previous literature as a need area (Anderson & Radencich, 2001). Based on these supervisors' experiences, the following patterns were unearthed and could be useful for informing research and practice of feedback processes. These supervisors agreed that a degree of emotional awareness and responsiveness is vital to the onset of feedback. This is not necessarily a characteristic of feedback delivered, and in actuality, this theme is in contrast to the literature review and could mean there is more to feedback than the content itself. As a result, there is merit in exploring the emotional and personal dynamics of feedback. How do supervisors handle difficult conversations with a teacher candidate, especially when evaluation of teaching can be deeply personal? How do emotions influence the way feedback is received from the perspective of teacher candidates, and what do they end up doing with the feedback information as a result? The implications of these questions are important for strengthening scholarship and investigating how emotions mediate the socially constructed experience of feedback.

In terms of the content of feedback, supervisors in this study suggested entering the feedback conversation by allowing the teacher candidate to speak first, or by posing a question so they could listen. The intermediate section of feedback typically includes elements that are constructive and more critically reflective (Ellis & Loughland, 2017), with the goal of ending the feedback process where the teacher candidate arrives at their own conclusions for how to improve or move forward (Hattie & Timperley, 2007). This potential structure is untested though. Interestingly, the very suggestion by participant Carson of a “co-constructed” experience is compelling enough to reconsider feedback as not necessarily an established sequence of events, but rather an interplay of both supervisor and candidate. From this perspective, co-construction *is* the structure. Could this be a taken-for-granted structure itself? Future scholarship investigating the most effective strategies of co-constructing feedback might provide insight to this question. Hattie & Timperley (2007) used quantitative data to suggest the effectiveness of different feedback mechanisms by classroom teachers, and there is a similar opportunity to explore the same within teacher education in agriculture. The literature has indicated the feedback process is a critical component within teacher candidate development (Darling-Hammond & Bransford, 2007; Ellis & Loughland, 2017), however, is lacking further explanation related to specific implementation in agriculture teacher education. These findings, while limited to a small population of university supervisors at one institution, have highlighted the socially co-constructed nature of the feedback process and illuminated aspects of the feedback process not yet considered or investigated in teacher education literature.

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Playing the Game: A Case Study of Latinx Leaders in an Agricultural Youth Organization

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Abstract

Latinx members of the FFA Organization are disproportionately underrepresented in leadership positions. When they do get elected to leadership offices, they oftentimes have to undergo behaviors that erase their cultural identity. This study aims to find what aspects of their identity they feel they have to give up in order to be seen as a potential state or national FFA candidate. Findings include participation in the state-officer game, joining cliques that fit the white mold, and overall, assimilation on an individual and group scale. Recommendations include systemic change for state and national FFA staff, agricultural education, and the agricultural youth organization.

Introduction

As the United States' population continues to increase, the demographics of school systems expands and diversifies. Although at-large, the population seems to be changing and social norms still conform to the dominant ideology that has pervaded our society since its creation—the ideology that benefits and prioritizes particular cultures at the expense of our marginalized communities. Social norms that reiterate success- type of clothes worn, style of hair, articulation of the English language- encourage our society to place a heavier emphasis on one culture.

Looking specifically at the United States school system, secondary education has a dominated culture driven by social norms that ask our students who do not fit the mold to assimilate in order to be successful (Faircloth & Hann, 2005). This assimilation leads to a change in outward behaviors and internal ways of thinking that can be damaging to already disenfranchised students. Students of color need the space to learn about and develop themselves in an authentic way consistent with their culture at home; but with school systems that look nothing like them and that indirectly (or directly) invalidate their experiences of oppression, this sense of belonging is often difficult to find (Faircloth, 2012; Garza, 2009).

Within secondary agricultural education, minority youth are struggling to feel included within the classroom space and the FFA organization (Barajas et al., 2020). The National FFA Organization has gone to certain lengths claiming an expansion in opportunities for marginalized youth with programs like Agricultural Education For All (ffa.org, 2020); however, state and national leaders along with the processes that elect them continue to amplify a narrative common in agricultural education (Elliot & Lambert, 2018).

In the agricultural education profession, a distinct lack of research exists prioritizing the voices of the underserved population at its center. Currently, research speaks about multiculturalism in agricultural education but stories directly from the mouths of students are slim (Roberts et al, 2009; Rodriguez & Lamm, 2016; Velez, et al., 2018; Vincent & Torres, 2015). The exploration of the experiences of Latinx members involved in the FFA organization is limited among the agricultural education profession. Prior research about Latinx/Hispanic youth looks at the

involvement of high school students in three different programs in Texas (Roberts et al., 2009), the perceptions of rural as opposed to urban privilege in one agriculture program (Elliot & Lambert, 2018), and the decision to enroll in an agricultural college and undergraduate program (Faulkner et al., 2009; Vincent et al., 2012).

Theoretical Framework

Critical Race Theory (CRT) and LatCrit analyzes race, racism, and other forms of oppression in the lives of people of color in order to disrupt these oppressive conditions between dominant and marginalized racial groups within the education system in the United States. CRT holds five central tenets (Delgado & Stefanic, 2017), which include: 1) The permanence of race and racism in society; 2) The challenge to dominant ideologies, specifically neo-liberalism in educational institutions; 3) The creation and manipulation of racial categories by the dominant group for their own benefit; 4) The racialization of minorities according to the needs of the dominant group; and 5) The importance of experiential knowledge, specifically with counter-storytelling.

Critical race theory uncovers the ingrained social inequalities of our education system and challenges the status-quo of privilege and oppression for our students of color (Ladson-Billings, 1998). In addition, CRT centralizes the voices of students of color who experience oppressive conditions and works to challenge the dominant ideologies, specifically those surrounding a need for immigrant assimilation, that perpetuate these conditions. By using the fifth tenet of CRT, counter-storytelling, experiences of our students of color can be authentically explored. Counter-stories serve as personal narratives from people of color that speak on their lived experiences dealing with their identity and living in a white space (Hiraldo, 2010; Huber, 2008). Counter-stories assist us in analyzing the culture of the youth leadership organization and provide ways to help agricultural education programs become genuinely inclusive rather than simply superficially diverse (Solorzano & Yosso, 2001).

Critical race theorists used counter-stories to critique the idea of immigrants needing to assimilate to American culture for future generational success, defending such criticisms with the second and fourth tenets of CRT. Researchers have long established that white society uses the idea of assimilation to “discipline” and teach immigrants how to “behave” in their white society, particularly teaching the ideas of submissiveness and English-only assimilation (Lash, 2018). School teachers, of whom eighty percent are white (U.S. Dept. of Education, 2016), are unaware, unprepared, and/or unwilling to address the specific needs of their Latinx students when it comes to healthy identity development. Without the development of their cultural identity, Latinx students are left torn between choosing to embrace their culture at home and being left behind in school and dismissing their roots and potentially succeeding in school (Marx, 2008; Villenas & Deyhle, 1999). Looking at the assimilation of Latinx leaders in the FFA could provide a tool for educators and policy-makers to begin looking at the structures and policies that force this internal cultural divide within our students in agricultural education.

Other studies that focus on Latinx students in agricultural education do not use CRT as the foundation that drives the study, nor do they use counter-storytelling to aid in these discussions of assimilation. Currently scholars focus on engagement or disengagement of marginalized youth and outline some barriers— teacher engagement, parent involvement, and peer opinion— to recruitment and retention (Barajas et al., 2020; Jones & Bowen, 1998; Roberts et al., 2009).

In DeCuir and Dixson (2004) used CRT as a tool of analysis of race and racism in education as they used qualitative methods to analyze the experiences of minority youth at an elite, predominately White independent high school. By uncovering the stories of these minority youth, DeCuir and Dixson provide educators and researchers strategies to counteract covert racist practices and policies that affect the education of underserved students across the US. Vaught and Castagno's (2008) use a qualitative design to uncover the attitudes and perceptions of white teachers at a heavily diverse high school where the racial achievement gap is high. Teachers from these high schools were sent to anti-racist and anti-bias trainings.

Purpose & Research Question

The study aims to fill a gap and gain a greater understanding of the need among Latinx youth to assimilate in order to fully engage in their extracurricular leadership roles. Through a LatCrit worldview, identification of the larger relationships between race, racism, and power in the classroom and in youth leadership organizations can begin to occur in the agricultural education profession and with agricultural educators.

Answering the following questions is necessary for future positive identity development and social engagement within our Latinx and Hispanic student population:

1. What unspoken practices of leadership offices in the FFA exist and reinforce racial inequalities particularly among Latinx youth leaders?
2. How do Latinx FFA leaders respond to the practices and their need to assimilate?

Methodology

Qualitative research works to answer the “why” behind a phenomenon (Creswell & Creswell, 2017). The researchers sought to examine why Latinx leaders in an agricultural youth organization are disproportionately represented in their respective states. In accordance with Yin (2018), a case study design approach was used with participant interviewed one-on-one, asking the same questions of this Latinx student assimilation.

We conducted interviews with past regional and state FFA Latinx officers in three different states: Arizona, California, and Texas from the last five years. Those states were explicitly chosen because each state population identifies as at least 30% coming from a Hispanic/Latino origin (Stepler & Lopez, 2016). New Mexico met the criteria; but after two efforts to include them in the study with no response, further contact was ceased. We followed Bernard (2017) steps to take before, during, and after semi-structured interviews in a case-study design. To gather a set of student participants, e-mails were sent to state staff in four states where the Hispanic/Latino population was greater than thirty percent (Stepler & Lopez, 2016). A link to submit interest was sent to past state leaders on behalf of the state staff who assisted in a snowball sampling technique.

A total of twelve interviews were conducted out of the fourteen who completed the online questionnaire. The two remaining individuals were unresponsive to follow-up emails so further contact was discontinued. Participants in this study were past state, regional, or district leaders of the FFA organization. They all identified as Latino or Hispanic, with many self-identifying with their ethnicity (Mexican, Mexican-American) or by simply acknowledging themselves as “brown”. Of the 12 participants that agreed to be interviewed: seven were from California, three

were from Texas, and two residing in Arizona. Five participants identified as young men and seven identified as young women.

To maintain confidentiality all 12 participants were given aliases throughout the study. Because Latinx state leaders are visible and relatively easy to find with a quick Google search, we will refrain from writing or outlining specifically what state they served or what year they were active in their leadership role. Instead, we will list their aliases and quick descriptions of their personalities based off the time spent with them: Arturo calm yet passionate, Rosa eager and quick, Isaac reflective yet hopeful, Gloria sunny and relaxed, Martin colorful and direct, Carlos neat and sarcastic, Francisco funny and realistic, Araceli intuitive and cool, Lisbeth shy and innocent, Olivia outspoken and caring, Elena fierce and confident, and Maria naive and peculiar.

After receiving approval from the Institutional Review Board, consent was obtained from each student participant through verbal confirmation. All 12 participants consented to be interviewed. Audio recordings of the interview were done and notes were taken throughout each interview. No videos or photographs of the participants were taken to ensure confidentiality.

Interviews occurred in the form of one-on-one conversations. The interviews resembled guided conversations rather than structured meetings. Bernard (2017) believed that semi-structured interviews was the best method for building genuine rapport with participants as semi-structured interviews allow the most room for open communication between both the researcher and the participants. Thus, the interviews resemble fluid exchanges rather than question and answer sessions. Eleven questions, along with clarifying sub-questions, were asked and spoken in English, though some brief moments of shared Spanish occurred and served to build rapport. The interviews were conducted online via Zoom and lasted between 60 minutes and two hours.

The collection of data followed each completed interview for common themes and recurring answers to each interview question (Schensul & LeCompte, 2010). Interviews were transcribed, and field notes completed during the interview to maximize the qualitative research design (2010). After organizing field notes and interview transcriptions, we began to gain a sense of general understanding of the information and reflect on its overall meaning. The data collection, through observation, will be more casual than formal. According to Yin (2018), casual direct observations occur through fieldwork, including those occasions during which interviews are being collected. One of the researchers paid attention to student expressions on particular questions, nervous tendencies with responses, and changes in mannerisms throughout the conversation. After each interview, we maintained a reflective journal and met the following day to debrief our findings. Multiple perspectives from the participants were presented.

Code development was based on the emerging information collected during each interview and placed in the reflective journals. Coding occurred on major topics discussed in the interview, repeated statements from a majority of the participants, and overall feelings from the participants perceived by our interpretations (Schensul & LeCompte, 2013). Constant comparison of field notes and transcriptions assisted in clearly defining codes found: analyzing, sorting, sifting, clumping those alike, and separating those different (2013).

A description of codes represented a detailed discussion of several themes and subthemes. Themes and information were interpreted in terms of how it expands upon the current literature in accordance with CRT and LatCrit. Through each of the processes triangulation occurred (Schensul & LeCompte, 2013).

The implementation of multiple validity strategies ensured trustworthiness, authenticity, and credibility of the findings (Schensul & LeCompte, 2013). Our biases were explicitly stated; this self-reflection helps us understand how interpretations of the data could be shaped by past experiences. Credibility will further be established through consistent checking of the transcripts and field notes to look for any possible mistakes made during transcription. Techniques used to establish credibility will be similar to those outlined in Connelly (2016) including prolonged engagement with the participant, member-checking, and reflective journaling throughout the process. Returning to examine the questions and the data will also be done to ensure credibility.

Dependability will be achieved to ensure that my data and findings are reliable and consistent throughout the study. Procedures to ensure dependability include maintaining an audit trail of a reflective journal, researcher notes, and debriefings. Confirmability of the data will consist of thorough comparison to data with the codes to ensure there are no shifting definitions or meanings of the codes over the course of the research process. This will be done to ensure bias don't influence the findings of lived experiences from the Latinx participants. Additionally, cross-checking of the data and codes occurred to ensure accuracy and authenticity of the information (Connelly, 2016).

Transferability of the findings will be done so that readers and future Latinx leaders will find the analysis of these lived experiences applicable to their situations (Polit & Beck, 2014). The study's transferability will be supported through detailed description of the participants and their stories and by being transparent about the analysis and trustworthiness (Connelly, 2016).

Various intersections of similarities and differences do exist between the researchers and the participants, leading most in the profession to label us as a "native" or "insider" in regard to Latinx members. However, like Narayan (1993) and Visweswaran (1994) state, even the most "native" or "insider" researchers cannot know everything about their own society. As a result, the researchers recognized their roles and created a reflexivity statement that they continually monitored and checked to assure their personal experiences affecting the interpretations.

Findings

The first research question-- what unspoken practices of leadership offices in the FFA exist and reinforce racial inequalities particularly among Latinx youth leaders? -- can be divided into three different subsections of answers. The sections appear as the following: (1) "Cool kids" cliques in the FFA; (2) a lack of networking opportunities for members; and (3) advisors' frequent reminders of differences between the aspiring student and a typical state officer. Here, we introduce "the game" of state FFA officer elections.

Cool Kids Clique - Of the most prominent issues highlighting inequalities for Latinx FFA members, participants spoke of the "Cool Kids" clique in each state and how membership in this clique determines their success for higher leadership offices. One participant, Rosa, spoke of her

time as a regional officer her senior year of high school. She didn't realize until she became a state officer the next year that the stereotypes of members at the regional level she witnessed then were still prevalent in regional officer teams after her own. When asked if she could further expand on the identities of regional officers, she said the following,

“There was definitely, like, a stigma of being a preppy kid during regional office. {What do you mean by preppy?} The popular kids [laughs] and they all hung out, and it was very exclusive, super-white, super popular, high achievers, legacy babies. Pushed to be perfect. Those kinds of people were the popular kids in our region.”

Many other participants voiced similar experiences with the idea of the “cool kids” groups. Francisco noted their existence in his states and highlighted some key differences between the popular clique and his group of friends in state FFA association. Francisco noted not only the personalities of the members of the popular clique but also pointed out the exclusion and isolation felt by his group of friends.

Gloria, speaks of her time as an FFA leader in high school and outside of it. She remembers how harmful these groups of “cool kids” were in making decisions for her future position,

Well, there were definitely cliques-- mostly a bunch of white kids with money thinking they were better than everyone else. I remember I did Nom Com that year and the majority of that [cool kid] clique was also in Nom Com; and before we even started interviewing, they went through the binder that had all the photos of the candidates and-- by looks-- started saying, “This person's gonna get it; this person's not.” And there was a trend with people they were choosing. {What trend?} Just a bunch of white people who fit the mold: white, skinny, nice hair.”

Martin speaks on the rejection from the future state officers known as the cool kid clique. Martin has long, curly hair, a backwards black snapback, and a small TV in the background. He tells me, in no uncertain terms, about the cool kids clique:

They were the people who were aiming to be state officers since like their freshmen year. They just carried themselves differently. Like I would pull up to them and say ‘what's up’ to them and no one would really like engage with me just because I was like a no one, just another f***ing FFA member to them. Until they got to meet someone like [X], who was a regional officer, that's when they were like, “Hey, what's up, how are you?”

Networking Opportunities - Francisco was an FFA member who was deciding on whether or not to run for state office, having a year of eligibility to run after graduating from high school. Although he finds his time in FFA and in agriculture education beneficial, he states the difficulty being a member of color in an organization that is a majority white. Francisco said the following about his state association and his lower-income, predominantly Mexican, rural high school,

No one from my chapter could ever be elected. When you look at the state officers they're all white, showed animals, come from farming families. When I think about having a chance [of getting elected state office] I really don't think I have one which is kind of, I would say, unfortunate; but it is what it is unfortunately. I've always seen white kids in state office. It's a niche of people who always hang out together, go to FFA camp, go to this conference or that conference, or who get badges and banners or whatever. It's like I'm not part of that and those are the ones that get state office.

Over and over, participants highlighted the importance of not just being a member of the “cool kids” clique but also doing the activities, events, and competitions that this clique does too. Only through these, oftentimes costly, networking opportunities-- like the leadership conferences, conventions, fairs, shows, and CDE events-- were members able to gain the attention of their fellow peers, other ag teachers, and state FFA staff who frequent these events as well.

Agriculture Teachers’ Reminders - To the third point, one participant spoke of her ag advisor’s frequent acknowledgment of the power white, popular members had in their FFA organization and how she was affected. Elena spoke of her time preparing for running for a regional officer position her junior year of high school. Elena had been an FFA member since her freshman year when she decided to seek out a leadership position beyond her chapter. When recalling the process, Elena remembers how her agriculture advisor approached the topic:

One of my teachers had come up to me and she pulled me to the side-cause they train you or whatever- and she, I guess, wanted to point out the obvious but she said, “When you think of a regional officer, what do you think of?” and I didn’t say anything [laughs] but I knew, but I didn’t say anything. And she literally said, “You see a bunch of skinny, white, blonde girls,” and she told me-- and I quote it because I’ll never forget it-- “You don’t look like that.” And I was in shock, but I also wasn’t because I knew, like I knew what I was getting myself into.

Though Elena praised her ag teachers frequently throughout the interview, she did say that their constant reminders of differences between herself and the officers on stage opened her eyes to the inequalities faced by Latinx members like her. These inequalities are the reason she decided against running for state office despite her position as a high-ranking regional officer.

Although there was a myriad of responses, subsections are outlined between these two findings for RQ2: (1) a precedent of past Latinx officers being rewarded for their assimilation; and (2) a majority of past white state officer teams and wanting to fit that mold;. Here, we introduce how Latinx members “play the game”. {A note to add: there will not be hard lines drawn between these two points as seen previously. Although outlined, the themes intersect with one another heavily in all and are not mutually exclusive. With assimilation, acculturation, adaptation, everything is blurry. Authentically, they spoke of a reality faced by students of color everywhere.}

Eleven out of twelve participants spoke of the “game” needing to be played when running for state office. When further asked about what “the game” was or how it was played, participants responded accordingly. Olivia spoke of “the game” to be played and how her agriculture teacher warned her about it.

There’s a game to be played, FORR SUUUREEE [laughs]. There’s a game and some people are phenomenal at it and I didn’t really know there was a game to be played until my junior year. My ag teacher, she was younger-- like slated in the early 2000s or something-- she told me, “Okay, I’m gonna be honest with you. I think you have a good chance of making it. But with someone who has as many feelings as you do-- that cares as much as you do-- Just be cautious cause this game is gonna be ugly. And I wish it wasn’t that way, I wish kids weren’t like this cause it’s not the end-all be-all.

For many other participants, they contemplated on their time participating in “the game”. Isaac reflects, “I really just wanted to fit in and be successful in FFA. [Pause] I would put the jacket on and want my hair to look nice and look the part. I definitely- I don’t know- I never define myself as my culture; I never emphasized I’m Mexican.” After asking for clarification, he tells me,

I remember not making the top-10 list for Creed and thinking, “Damn... Is it cause I speak funny or like did I say things wrong?” That’s when it hit me [pauses] like, “Ok, Isaac, what are the things we need to do to fix that or be better or fit this box that other people would check off?” Ultimately, I was like, “Okay, here’s the rubric. They’re looking for this, this, and this. How can we change you, so you can fit all these qualities?”

{What kind of qualities are you talking about specifically?}

Well, like, I was surrounded by a lot of Hispanics and would see them dirty because they worked in the fields, so I think-- wow!-- I think that’s what it was for me! Wow! [Clearly having some sort of realization.] I didn’t want to look dirty because I wanted to look clean and look like I have my.... I don’t know... just like trying to stray away from that as much as possible to move in a direction where I’m hitting another level. [He ends this sentence like it’s a question.] Just, like, trying to create an opportunity for myself. Oh, that sounds kinda tricky. [Pause] I don’t know. I knew I had to dress and act opposite of that.

{Act opposite of what?}

Of the Latino farm workers.

As a freshman in high school participating in the FFA Creed public speaking contest, Isaac had convinced himself to act completely different from people he had been surrounded by his entire life: Latino farm workers. Of note, Isaac’s parents are both farm workers in the southern part of his state. He associated himself with his hard-working, yet “dirty” parents. He associated his loss of the Creed contest with his self being “dirty”. Because he saw those that were successful (top ten Creed winners), he decided at that point to “fix” and change himself to emulate what he saw in the winning crowd.

Similarly, Rosa and Arturo speak on past leaders who influenced the way they thought about their Latinidad in relation to the FFA. When Rosa was a member, she didn’t see Latinx officers leading authentically. She remembers, “It didn’t feel like he was Hispanic or a person of color. He never talked about it or got specific to embrace his Hispanic culture or who he was. His retiring address wasn’t specific at all; it just felt inauthentic.”

From the beginning of their high school journeys, Rosa and Arturo see Hispanic leaders not as somebody representative of them and their culture, but someone stripped of their authenticity and seen as “white”. The same happened for Gloria who echoes her fellow participants in her feelings about the same [X] as above: “No, definitely there was that FFA-voice. And no, they would never have an accent. I don’t know if I ever necessarily saw them as people I could relate to just because they were Hispanic y’know?”

Another participant, Martin, describes what made other Mexican officers feel disconnected and unrelated to members like himself. Martin is a Mexican student who immigrated to the United States along with his parents when he was young; he is a proud older brother, identifies as working-class, and is a first-generation college student. He is unapologetically Mexican in his interview. Refreshingly, he cusses loudly and frequently throughout our conversation. He laughs

about the same past Mexican state officer who tried to “hide his brownness despite being six feet tall”. Martin says,

It was the way [X] talks... I remember hearing him. He was talking to some people at the Career Expo one day as I walked by, and I was like, “Oh, s***, what the f***.” {Why did you think that?} It was just kinda like [pause] it caught me off guard. Like, I didn’t expect him to talk like that. [Laughs] Like his voice didn’t fit him.

Unlike Martin, who was one of two members in this study who decided against running for state office, other participants saw behaviors of past Latinx officers as a precedent that was set and to be followed in order to get to the top. Arturo says, “I tried to keep myself more myself, but I started to strip away those layers of ‘Mexican’ and things like that because I thought that’s what I had to do.” A similar action occurred in other participants. Clearly, assimilation in mass was happening.

Throughout the interviews, participants used the term “white-washed” when describing Latinx members who acted white. I asked what it meant to be white-washed; though none gave me a strict definition, much like whiteness itself according to CRT (Delgado & Stefanic, 2017), their definitions were fluid and constantly changing based on location, age, gender, sexuality, socioeconomic status and the lens of their respective Latino culture. Olivia notes this in her interview about a fellow Latinx Hispanic member,

[X] would be, like, embarrassed to speak Spanish. We tried to get him to like be proud of it, but I don’t know [pause] there’s a lot there [pause]. I don’t know. He had a really hard time accepting who he was, I think. Like, he wanted to be white. Even though he’s more Mexican than me in terms of, like, the way he was raised, he speaks Spanish, he writes it, reads it, everything. He doesn’t show it. He doesn’t want it. He’s trying to be someone he’s not.”

Constantly in the interviews members repeated the need to be ‘white-washed’. Isaac says it explicitly first, “I can definitely say I was like white-washed. Not because of my chapter’s culture but the [popular] friend group I surrounded myself with.” Of all my participants, Isaac was the male who was fully immersed with the popular crowd. Though others had dipped their toes into the “cool kid” clique, Isaac makes it clear throughout the interview that he fully assimilated to white culture in order to be a part of the seemingly successful popular clique and recognizes the assimilation he had to do from an early age.

Gloria shares about a personal experience she had after finally deciding to run for state office. In her experience, former state leaders are *explicitly* telling her things to change about her appearance in order to make herself more electable. Most of these changes were to fit in with a basic white, female mold.

Elena speaks of a similar experience of being told to change her outer appearance to look more electable for state FFA office. Elena had earlier said that her ag teachers were “training” her. I asked her to elaborate on the word “train” to which she recalls,

They just show you how to be professional, how to shake a hand. Little things like that. [Pause] Straightening my hair, the whole makeup thing. She [her agriculture teacher] told me to do my makeup, like, “Really natural. Don’t make it look crazy.”

When asked if this was assimilation. She responds slowly, “You don’t realize that you’re doing it; you just see it as a way to, like, get the thing, get the position that you want.”

Lastly, Carlos tells me something that shockingly proves a point we were agonizingly waiting. Off-handedly and confidently, he claims, “I’ve been told I’m white-washed [small chuckle]. And I jokingly will agree. You know, I’m a coconut: dark on the outside, white on the inside. It doesn’t really affect me or anything. People have been calling me that my entire life.”

“It doesn’t really affect me or anything.”

“Being white-washed doesn’t really affect me or anything.”

“Others acknowledging my whiteness doesn’t really affect me or anything.”

But in the following statement he contradicts his first statement: “I didn’t feel like I had to be somebody else to run for office [pause] but that’s cause I was always kind-of white-washed. You know, I never fit any of the [Mexican] stereotypes.” He never fit any of the Mexican stereotypes. He considered himself white on the inside. He was elected as the only Hispanic member on his state officer team as was done for the past five years before him and since the years after him. *“It doesn’t really affect me or anything.”*

Conclusions, Implications and Recommendations

Most elected officers at the state and national level who identify as Latino/Hispanic were interviewed for this study. Of the past five years, state and national FFA associations elect Latinx leaders at a disproportionately low rate and when they did get elected, they tried their best to erase their culture to be seen as the right prototype of a leader. Over and over again participants stated they did not see themselves genuinely represented on stage with the state and national officer teams. Even at a district or regional level, members were hesitant to say that they were appropriately represented among their peers. In states where the Hispanic/ Latinx population is well over 30%, members failed to see their culture accurately celebrated. Furthermore, the National FFA Organization and respective state associations does not recognize that Latinidad encompasses a wide spectrum that’s defined as more than just “Mexican” or “brown” or even “Hispanic”.

Lack of cultural representation implies that Latinx members feel the need to wear a mask instead of really feeling connected to their peers and teammates. Faircloth (2012) writes about the reciprocal nature of the adolescent identity experience and the resulting impact on engaged participation and connection. Members need FFA connections to things that are foundational to them. Participant interviews showed that they oftentimes felt replaceable by another token Latinx student because they never felt like their connection to FFA was specific to *them*.

The game of becoming a state officer is described as changing the way one presents themselves and molds themselves to follow the state officer prototype. The game usually consists of players who come from rural, high socioeconomic backgrounds and fit the ever-changing definition of White, according to student participants and in conjunction with Critical Race Theory. Strategies to win “the game” (or get elected to state office) include assimilating to white behaviors such as language, dress, hobbies, music, and hairstyle to be seen as serious game players. Latinx members are assimilating to these behaviors because they associate Whiteness or non-Latinidad

to the state officer prototype. Latinx members want to fit this prototype because they want to fit in with characteristics of the rest of the crowd.

Though Latinx members are unaware of it, their actions fall under the pillars of self-categorization theory - group prototypicality has an important role when it comes to leadership (Hains et al., 1997). Specifically, more prototypical group members-- in an agricultural youth organization that would be defined as white, rural, conservative members-- are more likely to become leaders and are more likely to be perceived as effective group leaders than are *less* prototypical group members (which can be defined as our members who don't subscribe to traditional 'white' norms).

Whiteness and the appearance of whiteness does play a role when running for state office. As seen in student interviews, Latinx leaders did everything they could to appear less culturally diverse than their white peers. They became more agreeable and more palatable for FFA alumni, adult state leaders and staff, and agricultural advisors. Latinx leaders sought to become a high-ranking FFA officer at the expense of their identity.

We make the important distinction between assimilation theory and racialization theory as defined in Trietler (2015) because of how devastating racialization is for members of color. Though saying members had to 'assimilate' helps the everyday reader understand the process for our Latinx youth in the FFA, racialization conveys the inherent white supremacist attitudes underlying the belly of FFA leadership positions. These positions and the processes needed to be elected teaches our members the racial hierarchy existing in the FFA and in society at large-- that the whiter and more palatable you are, the more FFA, society, and the agriculture industry will accept you and celebrate you.

In order to get anything done, we have to start talking about racial inequality in our organizations. If conversations aren't happening, start them-- don't wait for people of color to begin these talks; do it yourself. Speak on issues loudly and often. Invite people of color into the conversation and *listen* when they join. Whatever you may think is the objective truth for agricultural education, remember it's *not*. Students of color have cultures, languages, and traditions that should be celebrated in every youth organization.

For secondary agricultural teachers, encourage students and FFA members to tell their authentic stories. Whether the story is just for you or their classmates or teammates, encourage students to speak about the various aspects of their identity (Faircloth, 2012) and then validate their feelings. Telling their stories clarifies a student's sense of self and creates connections to the classroom and FFA organization especially at the chapter level. Anzaldua's (1999) *Borderlands* encourages an 'identity-as-clusters-of-stories' metaphor which focuses on the construction of identity through the lens of telling one's life stories.

Research tells us that Latinx students perceive caring behaviors from their educators differently than white students (Garza, 2009). Adapting to student's needs and incorporating their definitions of perceived caring behaviors is essential for creating connections in the classroom and in the FFA program. Agricultural teachers should develop an understanding of motivation

and engagement for Latinx youth. Of the most important are (1) caring teachers, (2) strong community support, and (3) family ties.

For state and national FFA staff, a number of reasons previously listed in this study, the national and state FFA organizations have not achieved the same degree of diversity among their leaders and they have among their student members and alumni. Other organizations such as those in higher education who experience the same paradox have outlined some steps to take to address these issues. Reconciling this paradox must be done to ensure our students of color not only have a seat at the table but are actively engaged and listened to by other folks at said table.

Agricultural education university professors should begin by reading Schmitt & Bender's (1971) article "Teacher preparation for the culturally different." Though the article celebrates its 50-year anniversary, much of its findings are deeply relevant today. Tokenism of minority pre-service teachers should be replaced with commitment and genuine action if the educational hardship of minority students is to be improved. Only through systematic changes to the program and its curriculum can there be equitable opportunities for our preservice teachers and their future students.

Recommendations for Future Research

Although Latinos are regularly classified as the highest growing subpopulation in the United States (Schaeffer, 2019) minimal research has been done in regard to the Latinx experience in agricultural education. Of the studies that have been conducted, only two research teams have used LatCrit as a method for helping identify barriers for Latinos (Barajas et al., 2020; Elliot & Lambert, 2018). We strongly urge the profession to expand our research efforts to find a pathway to assist the Latinx community in becoming successful in agricultural education.

Discussion

Not only was the 2019 National FFA Convention impactful because of its election of Yomar Roman, but at the fourth general session and for the first time in 92 years, the audience heard the traditional opening ceremonies spoken entirely in Spanish. For reference, the opening and closing ceremonies occur at every formal FFA meeting that is conducted. Meetings occur at the local, regional, state, and national level; suffice to say, almost *every* FFA member can say the ceremonies word-for-word as they are taught in class their freshmen year and repeated until they graduate. Francisco is emotional when he explains the greatest impact on him as an FFA member was "the Spanish Opening Ceremonies and I remember being there and like we didn't expect it at all! Seeing the other officers speaking Spanish was a really cool thing. And we saw Yomar getting elected and it was-- Oh! -- it's a bigger thing cause, y'know, a Hispanic, a Latino as a national officer. We thought we couldn't dare."

Gloria was one of the Spanish speakers conducting the opening ceremonies during that fourth general session. She shares,

After the Spanish Opening Ceremonies, there were literally people in tears coming up to us saying, "Thank you for doing that" because they never felt seen or like they had a place because there is no one in [STATE] that looks like them. And it was just like, we are a part of this, we are accepted here, and it doesn't have to be the way we've seen it before. We're here and we bring something to the table. It felt good to do something [pause] big.

However, a note should be made that representation without voice though nice is not anything substantial to creating lasting change. Agricultural Education has the effective tools for everlasting impact and an effort to empower youth. By finding approaches to allow voices to be heard and action to begin, representation and outperformance will occur.

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You Can't Train Them to Care: Perceptions of Florida's Young Farmers and Ranchers Leadership Group on Necessary Skills for High School Graduates to Gain Entry-Level Employment

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Abstract

There has been an overall shortage of skilled workers in today's workforce. Employers expect graduates to possess skills such as problem-solving, decision-making, analyzing, using logic, making informed judgments and conclusions, and maintaining strong leadership qualities, such as written and oral communication abilities and attention to detail. The Florida Young Farmers and Ranchers Leadership Group board members participated in a focus group and shared their perceptions of the skills necessary for high school graduates to gain entry-level employment. This group was chosen based on their backgrounds to understand better the skills or abilities lacking among individuals entering the workforce. We recognized there was a general frustration with finding and keeping committed employees. Agricultural producers also noted that job applicants lacked the necessary skills for employment in industry operations. The findings of this study provide a glimpse of potential needs secondary agricultural education programs can meet. Based on this study, we suggest that school-based agricultural education programs focus on teaching and practicing essential skills, such as critical thinking, communication, time management and prioritization, willingness to learn, and confidence, in agricultural operations within the course program to meet industry needs and trends.

Introduction

Within today's workforce, there has been a shortage of skilled workers (Blickenstaff et al., 2015; Boa et al., 2018; Durst et al., 2018; Flores et al., 2012; Fuhrman, 2002; Gonzalez et al., 2022; Gray & Herr, 2006; Lane & Oswald, 2016; Pederson & Hahn, 2020; Perry, 2014; Sleezer & Denny, 2004; Slusher et al., 2011; White et al., 2012). As every industry has seen, there has been a continuous cycle of employees retiring. This rate is especially high currently due to the timing of retirement and sunseting of the baby boomer generation (Carnevale, 2003; Slusher et al., 2011). In addition to the limited availability of skilled workers, Slusher et al. (2011) found that 30% of high school graduates were not provided the skills they needed for employment. It seems high school agricultural programs have room to become more intentional regarding the confidence level of graduates when demonstrating their core skills (Gray & Herr, 2006; Slusher et al., 2011).

There is a strong importance regarding high school career and technical education (CTE) programs. There is a great benefit to supervised agricultural experiences (SAE) by teaching students the skills early in their educational careers. SAEs provide work experience within a desired field and offer students introductions to the industry, creating long-lasting relationships. These relationships benefit students when the time comes for them to enter the workforce by having pre-existing relationships and networking already in place (Crawford et al., 2011; Easterly et al., 2017).

Employers expect graduates to possess skills such as problem-solving, decision-making, analyzing, using logic, and making informed judgments and conclusions, as well as maintaining strong leadership qualities, such as written and oral communication abilities and their attention to detail (Knight & Yorke, 2003; Robinson & Garton, 2008; Sargent et al., 2003; Shaw et al., 2020; Whorton et al., 2017). Industry and business professionals identify colleges and universities as one potential route for students to obtain these necessary skills (DeAngelo et al., 2009; Rhodes, 2010; Shaw et al., 2020). However, employers have noticed that even recent college graduates lack the necessary skills, being basic requirements for workforce entry (Association of American Colleges and Universities, 2011; Erickson et al., 2018; Flores et al., 2012; Holzer, 2012; Shaw et al., 2020; U.S. Department of Labor, 2012; Wahl & Thompson, 2013).

Purpose and Objectives

The purpose of this study was to describe skills necessary for high school graduates to gain entry-level employment. Researchers aimed to identify the skills of high school graduates seeking entry-level employment upon completing courses in agricultural career pathways within Florida. The Florida Young Farmers and Ranchers Leadership group members were interviewed for the study based on their backgrounds, which align with the University's interest in gaining a more accurate understanding of the skills or abilities lacking.

Literature Review

As acknowledged by Erickson et al. (2018), the agricultural industry is ever-changing; therefore, workers entering the workforce need to have their skills in sync with the current needs of the industry. Erickson et al. (2018) also identified difficulties amongst the industry's ability to find workers of whom were proficient in the specific areas needing fulfillment, as different skills are necessary for different positions.

Slusher et al. (2011) concurred that specific skills needed to be incorporated in curriculum designs for animal systems pathways and cross-connected with college animal systems pathways to ensure that enrolled students are provided opportunities to learn entry-level skills desired by employers. For example, career clusters are where students declare a major and specialize their education in that area. Career clusters help direct and organize student career pathways, heightening the knowledge and skills for respective careers. Morgan (2012) identified a need for enhanced professional verbal and written communication skills, a strong work ethic, and a willingness to take on tasks.

In a Trinidad and Tobago study, Hurst et al. (2015) recognized that student-instructor relationships were stronger when the curricula were more technical and hands-on in nature. In exploring gaps within the needs of the agricultural industry and agricultural education, Maiga et al. (2013) focused on the skills and knowledge necessary for students to promote agriculture and food security within developing countries effectively. The study focused on developing the coursework to better prepare graduates to work in the agricultural communications field.

Morgan & Rucker (2013) reinforced the need for a stronger emphasis toward keeping school curricula current with the needs of the industry. A suggested approach included clear communication between the industry and academia, marrying the expertise of both professions to

inform future education. Kitchen et al. (2002) specifically focused on precision agriculture and suggested a stronger influence and presence of hands-on, practical experiences for students, allowing students opportunities to practice necessary skills. It is also emphasized that the instructors need to be familiar with and competent in the systems and processes being taught, as supported by Hurst et al. (2015). Cooperative research programs between industry and educators not only allow students first-hand insight and experience but also reinforce the industry's value and educators remaining current with each other's needs and advancements.

Theoretical Framework

The theoretical framework for this study was Human Capital Theory (HCT). The Human Capital Theory focuses on the intangible value of having educated and skilled employees and how that value benefits the company (Mincer, 1962; Psacharopoulos & Woodhall, 1985; Schultz, 1961). As cited in Nafukho et al. (2004), Lucas (1990) explained HCT as including a person's learning capacity as a necessary resource for producing goods or services. HCT explains how productivity can be increased through continuing education and skills training (Hurst et al., 2015; Knight & Yorke, 2003; Psacharopoulos, 1985; Psacharopoulos & Woodhall, 1985).

It is recognized that HCT is conflicted among academics. However, the originating definitions of the theory and the basis of this study complement each other. Schultz (1961) defined HCT as "the knowledge and skills that people acquire through education and training being a form of capital, and that this capital is a product of deliberate investment that yields return" (Nafukho et al., 2004, p. 547). Mincer (1962) defined HCT as the "theory of human capital as education and schooling that will prepare the workforce" (Nafukho et al., 2004, p. 547).

Between 1962 and 1985, HCT appeared to have more emphasis on economics, returns on investments, and profitability (Becker, 1964; Nafukho et al., 2004), later Cohn & Geske (1990) defined HCT as an "investment in education and training that has both private and social returns. Schooling and training increase one's productivity and thus one's chances in a free market to obtain higher wages – and certainly increase the contribution to the social product" (Nafukho et al., 2004, p. 548). Slezzer & Denny (2008) and Nafukho et al. (2004) argue that human resource development is a more current rendition of HCT.

The knowledge, traits, and abilities an individual possesses are either natural or taught, contributing to an individual's overall productivity (Kaufman & Geroy, 2007). Untaught ability, education, school quality, training, and pre-labor market influences can affect human capital significantly. Educators can help increase the likelihood of their students becoming employed by making investments early in a student's life, such as education, training, and skill development.

A content-based model for teaching agriculture requires curricula to reflect the context of the industry's current needs by 'creating' skilled workers (Roberts & Ball, 2009; Slusher et al., 2011). Agricultural educators need frequent and consistent professional development opportunities to stay current with their content and ensure they are teaching relevant topics and information (Easterly et al., 2017; Roberts & Ball, 2009; Slusher et al., 2011; Talbert et al., 2007).

Methods

The study population was young, emerging professionals in the Florida agricultural and natural resource industry. For the purposes of this study, a convenience sample was drawn using the Florida Young Farmers and Ranchers (YFAR) organization, specifically the board of officers ($n = 16$) who serve a two-year term. YFAR was created to “prepare the next generation of farmers and ranchers with the leadership and confidence to represent agriculture at the local, state, and national level” (Florida Farm Bureau, 2022). The program focuses on developing leadership competencies within participants through personal growth, public speaking, media training, legislative awareness, issue advocacy, and service leadership (Florida Farm Bureau, 2022).

Participants in the study identified as male and female, were early- to mid-career, and were under 35 years of age, per the YFAR program requirements (see Table 1). They have recently experienced career entry and are navigating the challenges of finding suitable candidates to work on their operations. These officers have maintained contact with their high school post-graduation as a source of job candidates or interns and are apprised of current talent pools. As members of YFAR and the officer team, participants possess a level of business acumen, including leadership competencies related to hiring practices, drafting and distribution of job descriptions, and offer a poignant perspective related to the purpose of the study. All participants were involved with the direct hiring process for their operations. Professions included commodity producers, farm store managers, ranch administrative assistants, and extension agents. Specific industries included dairy, beef, timber, potato, row crop, sugar, off-farm occupations, and feed and lumber stores.

Table 1

Description of the Participants’ Occupation, Experience, and Involvement in the Hiring Process

Commodity / Specific Position	Professional Years of Experience	Involvement in Hiring Process
Agronomy Former Extension Agent	5-10 years	Training & Operations
Beef Former Extension Agent - Ag & Nat Res	6 years	Hiring, Training, Operations
Beef	8-10 years Born & raised in industry	Training & Human Resources
Beef	10-12 years Raised in industry	Training
Beef, Citrus, Sugar Cane	10 years in sugar cane Middle/High School – beef/citrus College – sugar cane	Hiring, Training, Internship Management, Human Resources
Beef	Part-Time Raised in industry	Hiring, Training, Operations

Commodity / Specific Position	Professional Years of Experience	Involvement in Hiring Process
Beef	Born in industry	
Citrus, Aquaculture, Forestry, Beef	15 years Born into citrus industry High school – aquaculture Professionally timber	Hiring, Training, Operations
Dairy, Cheese Production	6 years Born & raised on farm	Hiring, Training, Operations, Internship Management, Human Resources
Feed & Lumber, Beef Division Manager	Feed/lumber, full-time 15 years in beef, part-time	Hiring, Training, Operations, Management
Fertilizer/Agrochemicals	10 years Born & raised in industry	Hiring, Training, Operations
Forestry Consulting	9 years Raised in industry	Hiring, Training, Operations
Land Management Procurement	12 years	Operations
Row Crop, Dairy	6-8 years in dairy industry	Hiring, Training, Operations
Row Crop, Ag Equipment, & Beef (cow/calf)*	12 years (row crop/beef) & 7 years (ag equip service manager)	Hiring, Training, Operations
Sugar Cane, Rice Farm and Research Manager	15 years	Hiring & Training

Note. * = This participant specifically stated that their operation was cow/calf; other participants stated that they were in the beef industry without specification.

The focus group questions were semi-structured to determine the challenges of hiring within various agricultural and natural resource industries due to the lack of skilled and well-prepared applicants (Erickson et al., 2018; Slusher et al., 2011). For example, participants were asked to describe the hiring process related to the candidate pool (What did the candidate pool look like? What was the range in work, educational experiences, qualifications? How did you work through the interview process? Were candidates asked to demonstrate their skill levels? What were your expectations for their skill levels?), skills desired (What skills were essential to you/your operation? What skills did you expect to be ‘down pat’? How much would you be willing to teach/train them? What were some desired skills that applicants did not have but needed to have?), and how they felt high schools could better provide the industry with the skilled laborers needed.

Data were collected from the sample in July 2022 in a one-hour-long focus group. The focus group was an appropriate method to allow participants to share ideas and experiences,

building off each other's perspectives for a more comprehensive understanding of the current hiring environment. The session concluded at the point of saturation across the 16 focus group members. The researchers supported data saturation with one group when they were learning nothing new despite asking additional probing questions (Saldaña & Omasta, 2022). The focus group size was acknowledged to be larger than the typically recommended six to 12 people (Masadeh, 2012; Prince & Davies, 2001). However, due to their familiarity with YFAR and the greater agricultural community, the comfort level between participants reduced the risk of intimidation, which would limit sharing of thoughts and opinions.

Researchers used transcriptions and hand-written memos. The transcripts were coded in two phases: open, inductive coding with *in vivo* codes (Saldaña, 2021). Meta-coding, or pattern coding, was then used to organize data into nodes or clusters to compare and condense data until distinct categories emerged (Saldaña, 2021). Multiple methods were used to establish rigor (Ary et al., 2018; Lincoln & Guba, 1985). Researchers reviewed the transcript and codes three times to identify the emerging themes clearly and ensure the themes were accurate. Research team members utilized triangulation to conclude patterns that emerged in the coding process, increasing dependability. Credibility came from rich descriptions from study participants and engagement in peer debriefing amongst multiple reviewers. Researcher bias was recognized using reflexivity. One researcher has a lengthy personal and professional background in the dairy industry, and two others are currently employed as agricultural education professors at a southern agricultural university (Creswell, 2013). Data collected expressed great significance to the literature and industry served.

Findings

Participants were asked about their experiences in managing an agricultural operation during the focus group. There was a specific emphasis on skills needed by employees. Through the inductive coding process, three major themes emerged. The first theme was related to human relations challenges and tradeoffs faced by employers, and the second theme that emerged was a skill gap between the available workforce and the needs of the employers. The third theme that emerged was related to employees' awareness of the value they can bring to an agriculture organization. Additionally, the specific technical skills desired by employers were explored. These findings explore how these themes emerged and provide detail through participants' voices.

A theme emerged related to the human relations tradeoff employers had to make based on employees' availability, reliability, and attention to detail. This tradeoff was difficult because recruiting and retaining employees was already challenging. Dealing with employee issues seemed among the most challenging for their operations. One participant noted, "hav[ing] to deal with 23 full-time people all of the time, and there's constantly issues."

Many participants shared recent experiences of not being able to find suitable employees or hiring them only to work for a brief time. Some participants' frustration stemmed from being unable to find and keep employees for lower wages and hourly positions. One participant noted, "We can only afford a certain clientele of folks." Another noted that their interview process was, "Can you be here at 7:00? Do you have a truck? Does it run?" Because they are hiring lower-wage employees, the participants noted frustrations with what they can accomplish in their

operations. One participant reported feeling "...held hostage by our employees" because they felt limited in what they could accomplish throughout the day. Some employers mentioned some success through H2A programs; however, others could not use those programs, as was shared by one participant. "In the dairy industry, we don't have a labor force. We have no H2A because that's seasonal. The government has not given us any kind of options in terms of a full-time, 365-day-a-year business."

The constraints surpassed what could be accomplished during the day and impacted how they chose to operate and grow their business. One dairy participant noted the possibility of limiting the size of their business to avoid the hassle of bringing in employees. He stated, "I think I'd rather shrink my business to the point where I could do it all by myself, even if that means seven days a week, than deal with the 23 employees I have constantly."

Another posed a question they used as a lens for hiring a new employee. They asked, "Is the investment in another employee even worth it? Is that person going to allow you to do enough work to really justify the opportunities from a revenue standpoint or the added headaches?" An additional challenge is the competition with other types of low-skill labor opportunities. Some participants noted that the nature of the work was more desirable in other fields. One fertilizer-industry participant shared of a recent hire who had left after one day because the work was too difficult and "...they could make more money at Popeye's."

Several participants noted other challenges of working within agricultural and natural resources. The seasonality and long days during certain times of the year were difficult for employees to manage. One row-crop participant added that he does not know what to do when one of his long-time grader operators decides to retire. "...I can't afford to pay \$60 an hour or whatever it is going to take me to find a grader operator running graders seven days a week all year long." The group also noted having difficulty paying competitive wages compared to other fields. The aforementioned participant stated, "You can't get employees [to run equipment] because construction is so hot right now." He continued to note that construction tends to have more variability depending on the economy, while jobs in agriculture remain steady.

The frustration was broader than lower wages and seasonal employees. Some participants noted their experiences hiring college graduates and individuals with prior work experience. One participant noted similar frustrations when hiring from this pool, "Those hires have been just as challenging in a very limited pool than even our hourly positions." The participants stated that the people in these positions typically served in supervisory roles. These supervisors tend to leave and find other jobs because they lack the skills to manage lower-skilled workers. According to one, "They spend most of their day babysitting instead of farming." This theme of frustration stems from a lack of basic agricultural knowledge and a commitment to success in the operation. One participant recognized that they needed to do a better job of training their employees in their operation. Based on this overall theme, there seem to be opportunities to improve onboarding training and school-based agricultural programs. There was also evidence of a cyclical nature of employment patterns. With other sectors, like construction and food service, also needing employees, it might be important for employers in agricultural fields to modify their employment practices to recruit and retain employees.

The second theme that emerged was that agricultural and natural resource professionals noticed some applicants lacked the necessary skills for gainful employment in their operations. Multiple participants recalled their recent hiring experiences and suggested applicants lacked soft and technical skills. One participant noted,

They don't have the practical side; you know, they can't take what they've learned and actually go out and apply it; they just know the theory behind it, and that's fine and dandy, but if you're going to be on the actual farm you got to be able to apply that as well.

Some participants were looking for applicants to come to the interview already having a specific skill set and ready to go to work. One employer noted, "For our ranch, a lot of the times we're hiring day workers, and we're hiring people that know what they're doing." In contrast, other participants needed a person to fill a position immediately, and they could train them in what they needed to know. However, employers noted not investing time in certain employees they felt would not last. One participant noted, "if you say you want to be autonomous, but you really clearly can't be, then I don't want to invest much in you, right? [Be]cause I know you're not going to be around that long."

One participant shared how they would interview an applicant,

We'll interview someone as many times as we think we need to... I'll have several face-to-face interactions with them, and we just have a casual conversation and just see, 'In these types of situations and your previous experiences, what did you do here? How did you handle that?' And then I kind of get a read for them as how they're going to perform, what's their dedication level to their job, how do they handle those types of stressful situations?

That participant also stated that they were in a growing phase and did not necessarily need someone to immediately fill a position, which heavily impacted their hiring decisions. "I don't have to have somebody today. I'm "getting them today for tomorrow" type of deal so I can be a little more selective in that I'm not in a crisis of I've got to have a tractor driver today." This individual also mentioned how they questioned the applicant during the interview to gauge "...how much do we want to invest in this person or are they just going to leave in a few years, and we're going to train them up for our competition...so that's a big concern."

Another participant shared that often, "we're hiring day workers...people that know what they are doing... [and then we're] hiring kids right out of high school just to feed cows in the feedlots [only asking] 'Are you afraid of cows? Are you going to show up?'" Additionally, one participant shared that they find certain skills are not a "make-or-break" situation when hiring. They are looking for more of an applicant's willingness to learn and try new things. "If someone is willing to listen to you and actually do it, I'm willing to teach them whatever, if they have that right attitude. I'd rather hire somebody willing to learn [the] certain skills I'm looking for."

When probed about the specific technical skills they would like to see in employees, the group listed obtaining a restricted-use pesticide license, running various pieces of equipment, identifying sick animals, fixing and servicing equipment, reading a syringe, doing conversions,

fractions, reading tape measures, basic applied math, computer skills, and basic finance. Specific soft skills they would like to see in employees included communication, forward-thinking, troubleshooting, critical thinking, problem-solving, adaptability, time management, prioritization of workload and tasks, accountability, drive, confidence, and willingness to learn (See Table 2). The participants noted this was not an exhaustive list of required skills but would provide a great start to give an employee a leg up as they enter into the industry. The experience levels of the applicants were also discussed as some participants welcomed prior experience while others would rather applicants not bring existing habits onto their operations. These preferences may vary based on the specific industry involved and the position that needs to be filled.

Table 2

Specific soft skills in employees as desired by employers

Accountability	Confidence	Forward-thinking	Problem-solving
Adaptability	Critical thinking	Prioritization of	Time management
Communication	Drive	workload/tasks	Troubleshooting
			Willingness to learn

A dairy producer noted, “I’d rather you not have experience...I would rather have a kid, 18 years old, show up that’s willing to work...I can train them the right way....” That same producer expressed the importance of work ethic because “you can train somebody...but you can’t train somebody to care.” Participants said they are willing to invest their time and effort into training applicants if they come into the opportunity with an open and willing-to-learn mindset.

Training was also mentioned as a burden on the operation’s productivity. “I’m hiring that person because I need that person as another operator. Well, to train that person, I have to take an experienced operator from what he’s doing to train this person.” Another group member suggested the group recognized no one might have ever taught them specific tasks, like how to use a ratchet strap or to shut a gate when they walk through one. Without having someone teach these basic skills, “we have to be forgiving, understanding educators when they come onto our property. We have to take the initiative to teach them.” Agricultural programs are a practical opportunity for graduates to learn these essential skills. The group widely agreed-upon this statement: “you can train somebody day in and day out, but you can’t pay somebody, and you can’t train somebody to care.”

A third theme to emerge from this focus group was that applicants seem to lack an overall awareness of the value they can bring to an operation and how their actions can impact the operation’s day-to-day business. One participant noted, “They are just there to collect a check.” Another noted, “They don’t understand where it fits into the whole process for what they’re doing and how it affects them.” This lack of buy-in to the operation resulted in unfocused employees being unable to make simple cost-benefit analysis decisions or focus on essential tasks. The participants noted that their employees might be physically present but lacked the buy-in to be part of a successful operation. One participant shared a story about an employee putting diesel fuel in a tractor. According to the participant, “The kid is in the cab, on their phone, with diesel

fuel spilling out. He doesn't even know. That's money pouring out on the ground! And he's like, oh, oops, sorry.”

Another example of applicants not realizing the cost of inattentiveness and the monetary impact their poor decisions have on the business is when someone is using a set of discs in a “field [that] was just laser leveled at \$125 an acre and dug a hole 100 yards into the field” because they had a plugged-up section but did not notice it because they were in the tractor playing on their phone. Not paying attention and being present in what they should be doing is not only frustrating and costly but dangerous in this industry.

Another common statement was that applicants can get the highest amount of training, yet if they do not care beforehand, they are not going to care afterward. “They don’t understand where [they] fit into the whole process, for what they’re doing, and how it affects them.” Applicants need to be focused and present in what they are doing and not be distracted mentally by their phones or thinking about what they are doing as soon as they finish their day.

One participant tries to limit as many distractions as possible, so

When we’re in the thick of it, I don’t answer my phone. I’m the one running things. I don’t answer my phone, I’m focused on the task at hand, and I feel like, a lot of times, they’re focused on what they’re going to do at 5 o’clock. They’re not focused on right now, being present in what we’re doing, critically thinking, being involved. They’re focused on what they’re doing when they get off work.

Most employers realize mistakes and accidents will happen but become frustrated because a lack of reporting worsens mistakes. One producer shared,

A kid that I had mowing hay for me backed into a limb and busted out the back window of the tractor. Instead of calling me and telling me that, he mowed the rest of the day, and then he parked the tractor with that broken back window. I had my bailer monitor in there, and it rained the next few days. That \$1,000 bailer monitor is now fried. If the kid would have told me he backed into a limb, I probably would have talked to them a little bit about paying attention, but we’d gone along, and I'd have pulled that bailer monitor out of there, and we'd been fine.

Producers also noted frustration when employees do not report issues or problems they notice. A dairy producer noted an instance when milkers in the parlor failed to report a sick animal. That producer noted,

I'm not expecting you to treat that cow, I'm not expecting you to cut that cow out, but I need to know that cow's sick. If I don't know about it and we don't see her not come to the feed trough, then she's going to go three or four days without treatment.

A few participants recognized that the level of respect and attention profited when they changed how they were having conversations with their employees and applicants. When the conversation changed from, *we* instead of *I*, “they feel like they’re part of the whole operation rather than just a, you know, tool.” One individual believed the lack of applicant understanding

was because "...they didn't grow up in it, so they don't know the costs that are involved and the time commitment that it actually is..." Another noted,

We have a season, and during that season, there is no start-stop time; it's we go until the job gets done. I feel like a lot of these, like whether it's a high school graduate or college graduate, that concept is not really instilled in them throughout their collegiate or high school career...[when] it's busy season, we may be there before the sun comes up and well after the sun goes down. So, then you do that a couple days in a row, and they want to drag up...but it's just that eight-month stint is too much for most people.

One participant shared that they "...worked until midnight last night on something that I sure as heck didn't want to be doing, but I love what I do, and I love the company. I know it's beneficial for them and part of my job." This general frustration stemmed from applicants not realizing the work hours needed to be put in during critical harvest times, and the fields often could not wait until tomorrow.

Conclusions/Discussion/Recommendations

The findings suggest a general frustration with finding and keeping committed employees, applicants needing more skills for gainful employment in industry operations, which support the work from Slusher et al. (2011). As represented in this specific population, the industry does not see recent graduates who can confidently demonstrate the necessary basic skills. These skills include the already noted communication and problem-solving skills (Knight & Yorke, 2003; Robinson & Garton, 2008; Sargent et al., 2003; Shaw et al., 2020; Whorton et al., 2017), as well as respect, commitment, troubleshooting, time management, prioritization of tasks, and willingness to try and the ability to learn new skills or techniques are related to agriculture and every aspect of life. A gap in skilled wage employees has created recruitment challenges in agricultural businesses.

From research by Slusher et al. (2011), we know high school graduates are lacking relevant skills. High school agricultural programs could be a potential conduit for skilled agricultural labor to provide students with the entry skills needed in these operations. To accomplish this, agricultural educators should work to stay in touch with the industry's current needs. Based on the findings of this study, there could be an increased emphasis on diagnosing problems and formulating reasonable solutions. There could also be increased exposure to introductory technical skills common across agricultural operations. Working to address these skillsets contributed by industry professionals responsible for hiring new talent can help to address the need for ready-made graduates (Association of American Colleges and Universities, 2011; Bean, 2011; Brooke, 2006; Brown, 2003; Herreid & Schiller, 2013; Huba & Freed, 2000; Marin & Halpern, 2011; McDade, 1995; Popil, 2011). The specificity of these skills should be the focus of further inquiry.

Our findings indicate that job prospects lack awareness of the value they offer operations and how their actions directly impact a business's profitability. Clarifying students' influence on the operation's productivity would be a valuable relationship to reinforce in the classroom or through SAE programs that connect students to professionals through long-lasting relationships (Crawford et al., 2011; Easterly et al., 2017). This can correct the lack of buy-in researchers

found from the employees in these operations. Relationships with job prospects to foster value and connection could be enhanced from the industry's professional side. Training and professional development related to building a cohesive team and similar leadership competencies could be helpful for these producers.

Aggregating the present findings with previous studies on student workforce preparedness can create a baseline for the relevant student-focused knowledge in agricultural education programs. This study used qualitative methodologies and non-generalizable sampling techniques; therefore, practice caution when implementing the findings. Researchers recognize the limitation of the convenience sampling method and recommend replicating the study with additional Florida agricultural professionals. This study provides a general view of the challenges faced by producers and the skills necessary in the industry.

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One Without the Other: Contextualizing Mobility Through Discourse Analysis

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Abstract

Community engagement has significant impacts on SBAE teachers' perceived opportunities to remain at their schools or in the profession at large. We wanted to better understand how interactions between teachers and their communities invoked challenge or support, particularly in helping us understand how to retain mobile teachers. Specific to this study, our purpose was to understand how individuals in communities interacted with each other's positions to better identify where support and challenge were perceived. This study utilized discourse collected through a series of interviews based in dialogue with several actors across a migratory context. To evaluate the use of positionalities, we aligned the positions of each group against the other. This condensed to three themes in answer to question one: Conflicting Requirements, I Can and I Will, and All My Love and Support and themes of Support and Challenge to answer question two. These themes culminated in an interactional work cycle recognizing replaceability, and we discuss the implications of this work cycle for SBAE teachers and community influencers alike.

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Introduction

In our recent work with mobile school-based agricultural education (SBAE) teachers, we sought to identify the positions *mobile SBAE teachers* (SBAE teachers who have changed schools at least once), and their *community influencers* (those local to the SBAE teacher impacting program operations), occupied. Substantial research in agricultural education discusses the necessity of working relationships between SBAE programs and their broader community (Eck et al., 2021; Langley et al., 2014; Moser & McKim, 2020). Community engagement has significant impacts on SBAE teachers' perceived opportunities to remain at their schools or in the profession at large. In our previous work, mobile teachers expressed community support as one of the greatest factors contributing to feeling supported in their teaching practice (Haddad et al., 2019). Having previously identified the positions within a *migratory context* (a site of mobility work), we found ourselves eager to understand the interactional interplay between mobile SBAE teachers and community influencers.

Positioning is an interactional occurrence (Davies, 2000). Simply understood, positioning is how actors work to establish themselves in conversation. We are constantly positioning ourselves in the ways we talk, and our opportunities for positioning depend on the positions available in the interactional context. This can be localized to the relationship, extended to the

local social culture, or ascribed to the way broader ideas and beliefs are articulated (*discourse*) (Davies, 2000). In this way, discourse analysis examines power dynamics in interaction, recognizing the availability of positions to the actors in context (Davies, 2000). Harnessing the potential to examine subscribing to broad discourses by examining the local order (Harré & van Langenhove, 1999), our study sought to examine discourse by looking at and through positions (Davies, 2000). This meant we operationalized teacher mobility as an interactional endeavor comprised of taking up, reifying, and rejecting available positions (looking “at” positions). It also meant we examined the positions themselves to understand how divergent positioning might impose challenge, particularly when support was intended (looking “through” positions).

We arrived at positioning theory knowing a variety of means existed to examine *teacher migration* (patterns of teacher mobility), *school discursive context* (the socially constructed norms of the school), and *teacher positionality* (teachers’ efforts to situate themselves in their context). Ample literature has studied the ill effects of mobility on students and teachers (Atterbury et al., 2017; Feng & Sass, 2012; Gary et al., 2015; Goldring et al., 2014; Ingersoll, 2001; Ronfeldt et al., 2012; Ross et al., 1999; West & Chingos, 2009). At this writing, over twenty years of compiled research, from a variety of perspectives, made up the knowledge base around teacher *attrition* (departure from the teaching profession), *turnover* (loss and replacement of teachers at the school level), and *mobility* (teachers remaining in the teaching profession through changing schools or districts). However, there was a gap in the existing literature between an organizational approach accounting for the detriments of mobility on school systems and a discipline specific (in this case, SBAE) accounting of mobility as healthy, if not necessary, for some teachers and their career (Haddad et al., 2019; Haddad et al., 2021; Smith et al., 2022). Little research examines teacher mobility from an asset-oriented perspective, and little exists to clarify career mobility as its own episode, comprised of several distinctly human phenomena.

Besides summarizing the current state of education, the literature also exposed the current discourses around issues of the teaching career, teacher mobility, and the positionality of mobile teachers in school contexts (Davies, 2000). While teacher mobility provided the context for this study, questions regarding teacher positionality in school contexts remain. The literature has focused on student impact and relationships almost exclusively (Atterbury et al., 2017; Borrero et al., 2012; Harris & Sass, 2007; Hazari et al., 2015; Turner et al., 2013) and left relationships with colleagues, administration, and others to the fate of anecdote. Therefore, the question guiding this study is: How do positionalities influence the support and/or challenge perceived by mobile SBAE teachers and their communities?

Related Literature

To understand the available interactions and subsequently, available positions, within a discursive context, we first needed to understand how mobility is discussed in the current literature. The literature, in this case, says as much about the current research as it does about the discourse to which educators subscribe in establishing a career. Various approaches in the literature attempted to describe teachers’ career patterns relative to mobility. This body of work, however, focused largely on teacher satisfaction (Chapman & Lowther, 1982), differences in career patterns for male and female teachers (Murnane et al., 1989; Whitcombe, 1979; Whitmarsh et al., 2011), and the intention involved with patterns over the course of a teaching career (Burden, 1982; Draper et al., 1998; Peterson, 1978).

The examination of teachers' career patterns began by working with retired secondary school teachers (Peterson, 1978). Peterson (1978) found little work supported articulating the teaching career. She attributed much of the challenge to defining the teaching career to bias in definition and the variety of methods and philosophical perspectives already at play in education. In other words, she identified a dissonant discourse about what constituted an effective teaching career based on how the teaching profession was structured and how teachers were socialized. In recognizing these challenges, Peterson (1978) echoed Lortie (1975), claiming teaching is not a true career with a progression of sequenced steps of *upward mobility*. Understanding the teaching career in terms of lack of opportunity for upward mobility identifies a systemic structural driver of *lateral mobility* (moving between schools).

In considering teaching as an *unstaged* profession, we recognized the teacher does not have access to specific progressions denoting their expertise within the profession. This is problematic, as little about the structure of the profession incentivizes retention. The profession then must rely on the desire of the professional for continued engagement. As we are seeing across the news in 2022, this desire is dwindling, both in the current teaching force and potential recruits. Important to this study is the assertion *upward mobility* in teaching involves *leaving* the classroom (Burden, 1982; Draper et al., 1998; Peterson, 1978). If a teacher is to improve their position, they must progressively engage in *lateral mobility* (moves between school environments) to experience promotion while remaining a classroom teacher (Burden, 1982; Draper et al., 1998; Peterson, 1978). This type of mobility attempts to better the teaching environment without necessarily changing the station of the teacher. Peterson (1978) recognized the various improvements gained through *lateral mobility* as significant victories necessitating acknowledgement as part of a career pattern in the social world of a school. To only see teaching organizationally implies a false availability of career incentives for classroom teachers (Peterson, 1978). As such, an organizational approach would be inherently at odds with the actual state of the teaching profession. Through mobility, teachers were exercising autonomy over the system in which they worked and reified positions of *individualistic*, *conservative*, and *present focused* (Haddad et al., 2019; Lortie, 1975; Peterson, 1978). Ultimately, Peterson (1978) concluded by offering success for the individual teacher as partially measured by teaching circumstance. Moves to more desirable teaching positions, in effect, are the marks of a *successful teacher* (Peterson, 1978).

The above are challenges for any teacher. We theorized; however, these challenges magnified in teaching positions that relied on community engagement (e.g., SBAE). The literature corroborated this challenge. SBAE teachers were broadly described as filling multiple roles (Robinson et al., 2013), having the unique identity of agriculturalist and teacher (Shoulders & Myers, 2011), being overworked (Traini et al., 2019), and interacting extensively with a broad community on multiple levels (e.g., FFA, SAE, classroom, etc.) (Phipps et al., 2008). They were diligent, daring, and devoted educators (Roberts & Montgomery, 2017). In addition to operating in a system with little room for upward mobility while remaining in the classroom, there was little room for the SBAE teacher to be mediocre, let alone poor (Traini et al., 2019). In our previous study, we heard teachers position themselves and be positioned by their community influencers based on their ability to meet expectations (Haddad et al., 2020a & b). In this way, the social expectation of teachers as individualistic, conservative, and present focused (Lortie, 1975), and the professional expectations of SBAE teachers converge on the mobile SBAE

teacher in ways that raise the potential for challenge as they enter new environments and communities.

Discourse Analysis & Positioning Theory

Given this understanding and the expectation for embeddedness of SBAE programs in their communities, we approached SBAE teacher mobility using a positioning theory approach to discourse (Davies, 2000). Recognizing theory's centrality to this interactional form of discourse analysis, positioning theory provided both the framework and methods for our study. Positioning allowed us to look *at* and *through* the relayed interactions to better understand the local and professional discourses in which the participants interacted. As a framework, positioning helped us understand mobility as an interactional endeavor related to discourse. As a method, positioning engaged the participants in identifying their roles in interactions through discourse. The approach was both participatory and transformational (Patel Stevens, 2004). Furthermore, positioning theory approaches discourse to recognize the multiple ways an episode may be perceived (Davies, 2000). For example, a teacher may position themselves as *supported* if they have the resources to do their job, but a community influencer may see their positioning of *being supportive* rejected if their attempts beyond resource deployment are not engaged. By understanding how taken up positions were perceived by SBAE teachers and their community influencers, we may be better able, as pre-service educators and SBAE researchers, to pre-empt conflicts in community engagement as new and mobile teachers alike step into new programs.

Currently, SBAE research adopts a stance toward mobility as a *source of new hires* in the NAAE Supply and Demand Studies (Smith et al., 2022). In aligning with this approach, we offer a discipline-oriented and community-situated perspective to issues of teacher mobility. This identifies the multiple ways individuals interacted with and around their work. Without discounting the impacts of teacher mobility on schools, a gap in the literature existed in seeking out mobile teachers to determine how they may be unique in their professional choices and needs relative to their exiting, or even first-year-teacher, counterparts.

Purpose & Research Question

The broad purpose of this line of inquiry is to understand how engaged positions invoked challenge or support, particularly in helping us understand how to retain mobile teachers. Specific to this study, our purpose was to understand how individuals in communities interacted with each other's positions. We engaged this purpose to better understand where support and challenge were perceived. We wanted to know how mobile teachers and community influencers aligned (take up, reject, or reify) themselves with assigned positionalities. We also wanted to explore how such alignment invoked support and challenge in the interaction between SBAE teacher and community influencer. These questions address AAAE Research Priority 3, Question 2: "What methods, models, and practices are effective in recruiting agricultural leadership, education, and communication practitioners and supporting their success at all stages of their careers?" (Roberts et al., 2016).

Methods

This study utilized discourse collected through a series of interviews based in dialogue with several actors across a migratory context. We operationalized *interviews based in dialogue* through a semi-structured protocol, allowing significant time for participants to unpack the meaning making of their experiences as they continued to share (Davies & Harré, 1990). Our *actors* (participants), at the time of the study, included two former agriculture teachers (Aaron and Stephanie), the current agriculture teacher (Jessie, discussed by others, but later withdrew from study participation), the current assistant principal (Aaron; also former SBAE teacher), two former industrial technology teachers (Ben and Caleb), and the current FFA Alumni president (John). In addition, we engaged the state supervisor (Mark) for additional context of the state community, however, given his distanced engagement with the site, we did not consider him a participant. Collecting interviews based in dialogue involved an initial discussion with these actors regarding their experience with the various episodes of mobility (e.g., hiring and onboarding processes and their work) (Patel-Stevens, 2004). A follow up interview allowed the participants to interpret and make meaning of their reflective experience back to the researcher.

Having discussed the process of determining positionalities in a previous publication, we were concerned here with understanding the perceived interplay between the identified positions. For the current study, we focused on the metalanguage participants generated in reflecting on their discussion of reflective experience (Patel Stevens, 2004); in other words, we focused on how participants ascribed meaning and position within their reflective process. These were the foundation of identifying alignment across positionalities as participants recognized how their positioning of themselves may have interacted with intended positioning from others. We were interested in how the two groups' desired positions took up, rejected, or reified the desired positions from the other group. To evaluate the use of positionalities, we mapped codes, definitions, and aligning positions of each group against the other. These positions and themes comprised the analysis for the current questions. Coding yielded 24 concepts (positions) in four themes for SBAE teachers and 17 concepts in four themes for SBAE influencers. This considered the uptake, rejection, and reification amongst the participants in this study and in light of research discourses related to support and challenge for mobile teachers. This regrouping condensed to three themes relative to the interactions positioning mobile SBAE teachers and their community counterparts: *Conflicting Requirements*, *I Can and I Will*, and *All My Love and Support*. While the general positionalities were discussed in previous studies (Haddad et al., 2020a & b) we focused here more specifically on positionalities indicating support and challenge. We aligned mobile SBAE teacher positions of *supported* and *up for a challenge* with community influencer positions of *supportive* and *challenged*.

Regarding our own positionality, and in line with engaging a community-based approach, I (a research team member) was a former SBAE teacher in this context. Therefore, participant-researcher relationships were already present allowing for genuine conversations with mobile teachers and key influencers, and accurate tracking of teachers in this context (Patel Stevens, 2004). My embeddedness in the research site was central to this study, recognizing my interpretations of the context, informed by my experience (Harré & van Langenhove, 1999). Proceeding in this way called for a particular "forthrightness about intents" (Patel Stevens, 2004, p. 184), which accounted for institutional positions, reflexivity, and answerability. While we only examined one site, our focus on interaction made this a discourse study. We were concerned with interaction as a means of enacting relationship to understand the interactions available to all participants as subscribing to broader discourses of what education and teaching are.

Discussion of Findings

How do mobile SBAE teachers and community influencers align (take up, reject, or reify) themselves with assigned positionalities?

In identifying similar and opposing positions between SBAE teachers and community influencers, three themes emerged: *Conflicting Requirements*, *I Can and I Will*, and *All My Love and Support*. Within the *Conflicting Requirements* theme, interactions of attempt and intention sought to yield better programmatic results for all involved. Unfortunately, lack of clarity in expectation challenged the uptake and reification of positions allowing forward mobility through *vision*, *growth*, and *needed change*. As alumni president John put it:

Unfortunately, I like [the ag program] to be something like you were building there. We talked about it as a group. We never wanted to have said, "...This is how [the former teacher] did it." It wasn't a great topic...They say, quite often, the worst place to be is following a successful person...But in your case, there was a high expectation, so we were very aware of that.

This is just one example of those involved positioning themselves as *doing the right things*. Few set out to engage the wrong things in their interactions. However, if the right things were not clearly and mutually agreed upon, those things were not taken up and reified. A failure to take up attempts at the right things invoked, in some instances, an irreconcilable challenge to positionality. While not a surprising finding, it bears a place in writing: Without all involved agreeing on the *right things*, it is difficult to find a way forward allowing SBAE teachers to position themselves as *meeting expectations*. Teachers and community influencers also elaborated substantial expectations for each other and the SBAE program they supported. To identify which were the right things became especially challenging when one teacher was positioned as *doing the right things* without verbal articulation. Community influencers described ideas of successful predecessors but did not identify the concrete actions that secured those positions as clearly.

The interesting finding within the *I Can and I Will* theme is the *not*. There was a discrepancy in mobile SBAE teachers and community influencers positioning themselves with how they positioned each other. More importantly, there was a discrepancy in the positions each afforded the other. While both relied on similar positions, *resilient survivor*, *autonomous individual*, and *imposter* were taken up, reified, and rejected in ways that could incite conflict among the participants in this study. Former SBAE teacher Stephanie gave this example of her frustration:

I was hired with this promise of, "Do what you want. It will be your program and you can turn it into whatever you want it to be." That was pretty appealing to me. The reality was half the time I was teaching Junior High, which was not my fave, and the other part of the time was the high school stuff...I added some of my own stuff but was tied down schedule-wise by the Junior High electives and that wasn't something I was really into.

Both community influencers and mobile SBAE teachers were *resilient survivors*, but only community influencers saw their counterparts this way. This had implications for extended

courtesies based on positioning. In other words, if only one party saw themselves as occupying a particular position, they expected courtesies they were unwilling or unable to extend. Similarly, these SBAE teachers perceived themselves as *autonomous individuals*, a position reified by their community counterparts. However, our teachers did not articulate extending this same position to their community influencers. Among these participants, this added additional challenge when the teacher had a vision they desired to enact but did not recognize the autonomy of the others involved in bringing the vision to fruition (or not). Both mobile SBAE teachers and community influencers positioned the teacher as an *imposter*. Among our participants, this manifested in teachers acting the part, despite feeling otherwise. Community influencers expressed a desire to provide support, not expecting the teacher to perform as a site veteran. However, their attempts occasionally served as a double rejection. In essence, teachers perceived their attempts to reject positions of impostership rejected by certain attempts at support.

In these tellings, uptake, reification, and rejection turned to ideas of reciprocal investment, as exemplified in theme three: *All My Love & Support*. In essence, did community influencers position SBAE teachers as *equally invested* rather than merely *invested*? Among a multi-voiced concern for outward shows of investment from the SBAE teacher, Ben, former industrial technology teacher added:

In a town the size of Oakville, people really appreciate the teachers that live in town and go to their churches, are there for other activities. They see him go downtown to the parade, and all that stuff...When you have a smaller town, that's one of the things that has changed a lot...It's just different...but we've noticed people really appreciate if you're living in the town you work at.

The importance of this finding is the nuanced investment beyond ties to place. *Investment* was the culmination of, and was predicated on, *connection* and *support*, but went beyond the provision of these positions to an expected uptake of connectedness and being supported. In other words, the idea of investment built on and derived from the prior conceptions of compatible positions. If a teacher did the right things with perseverance, they were positioned as invested. Investment, then, was both a product of place and interaction.

Taken together, the themes *Conflicting Requirements*, *I Can and I Will*, and *All My Love and Support* compiled an interesting landscape for mobile SBAE teachers and their community influencers to navigate. First, the expectations from community influencers on these teachers were numerous and varied. Taking up positions relative to these expectations was imperative for SBAE teachers. However, this became a competing requirement with their own efforts at independent positionality. Second, survivorship and autonomy were at odds with each other. SBAE teachers and community influencers each took up these positions but did not always extend the courtesies of these positions to others. Whether for lack of opportunity in the interview or truly not viewing their counterparts this way, mobile SBAE teachers did not position the community members with whom they interacted as surviving or having autonomy. Finally, positions of *support* and *connectedness* tied closely with *investment*. Community influencers reified mobile SBAE teachers' attempts at investment where support and connectedness were reciprocated. These teachers took up support, but also recognized rejection in their investment efforts if they did not align with the community influencers' positions of being supportive and connected.

How do positionalities influence the support and/or challenge perceived by mobile SBAE teachers and their communities?

In articulating implications of support, teacher educators, administrators, researchers, and other community influencers can better understand how teachers feel embedded in their communities. To identify the interactions invoking support and challenge, we aligned the related positions. The findings led us to operationalize *support* and *challenge* as follows:

1. *Supported/Supportive*: Taking up a *supported* or *supportive* position was an explicitly reciprocal positionality. One cannot be supportive without someone else taking up being a supported other. The challenge implied is the means of support relative to what is perceived as needed by both parties involved.
2. *Challenged*: Being in the position of *challenged* highlighted a nuance in desire. Some *challenge* was desirable, as it fostered continued change and growth, pushing an individual forward. Other *challenge* was rejected as an affront to autonomy or other attempts at desired positionality.

Perceptions of support imposed a significant challenge to the occupation of such a position. Being supportive was a significant undertaking. The reification and uptake of *being supportive* was a substantial investment of material, experiential, emotional, mental, and time resources. If not returned, it was quickly withdrawn while subsequent position occupation efforts of *being supported* were rejected.

In both the initial and follow up interviews, participants discussed what support looked like. The occupation of a position of *being supported* consisted of check in, encouragement toward professional development, mentoring, ample resources, schedule accommodations, classroom management support, encouraging autonomy, and connectedness among staff. Stephanie emphasized her mentor relationships with Aaron and Ben:

[Aaron] was especially helpful with some of the discipline things...because he already had relationship and rapport. Him being able to tell me, "This is who we use for welding materials," and "This is what we've done with whatever," was so helpful.

Outside of the school, community reifications of *being supported* included: conversations regarding personal interests and background; service as guest speakers, hosting field trips, or coaching CDE teams, and attendance at FFA and SBAE functions. This list was minimal compared to the support community influencers sought to provide. While John started our conversation discussing material benefits provided by the alumni, he emphasized connectedness throughout our discussions:

I'd like to be able to make contact before there's any interaction with students. Just to provide some insight as to who [the Ag Alumni] are and what we do as a resource is extremely important. The first few weeks of school can be overwhelming. You've almost got two roles...The alumni support group ties in more what happens before eight o'clock or after three with the FFA side, more than with the day-to-day classes. That's up to the teacher.

Community influencers took up being supportive as outlined by the SBAE teachers. Yet, their desired positions of support also encompassed financial stability, continuity of institutional knowledge, content expertise, facilitation of community connectedness, support of challenging students, and providing direction and input for the forward progress of the total program. With ideas closely related to themes from the first question, participants carried out the *right things* with autonomy, but without clear agreement about what the *right things* were. Unfortunately, anything less than uptake and reification was a slight to the investment of community influencers; a slight that would inevitably cause support and connectedness to crumble as available positions within the SBAE teacher's repertoire.

In discussing findings related to challenge, we remind the reader that challenge and support are not opposite; they also may not occur on a continuum. In fact, among our participants, challenging each other was seen as a healthy interaction invoking support. However, there was also challenge between participants that did not invoke support. This type of challenge was less about ability to do the job or even the will. *Challenge* here became a symptom of conflicting positions and expectations within the interactive context. The needs of a community influencer to position themselves as supportive placed heavy emphasis on lack of communication in their positioning of mobile SBAE teachers as *challenged*. Aaron said,

Lack of communication really starts it. When you don't have good communication, relationship dives. That's when the feelings of inadequacy or not being heard will start to get in. Then there's animosity built, and then negativity.

As much as these teachers looked for support in their communities, their community influencers sought to provide it. Ben corroborated:

I would try to connect with Stephanie for a short time, almost every day, to ask how things were going, see if she needs anything, see if she's pulling her hair out or not...but we can't really help them with too much to start...She has to actually decide to seek somebody out if she needs help.

Not surprisingly, challenge was articulated in various ways. Community influencers found themselves better equipped to see the challenges the SBAE teachers faced. This was in part because influencers saw their SBAE teacher as a component of the broader, local agricultural community. This situated them to identify challenges more broadly than those occurring within the school context. Teachers, on the other hand, saw influencers as a component of a successful program. This did not mean they ignored the context of the broader agricultural community, but those challenges, if addressed, were secondary to the challenges of the local school context.

Influencers had been involved with the broad agricultural challenges before the SBAE teacher came to the community and would continue to address those challenges long after the teacher left. At the school level, community influencers had dealt with onboarding new teachers and navigating the local context multiple times. These mobile SBAE teachers, however, made little acknowledgement of the challenges the community recognized (broadly, or within the school context). Aaron and Stephanie seemed to be in touch with the challenges of the students and need for classroom related communication. However, neither teacher was able to

acknowledge the challenge of program turnover as articulately as the community influencers could. The teacher did not have to pick up the pieces dropped when they left. Community influencers were looking for opportunities to connect the pieces together in ways that made it more difficult for the whole to come undone with teacher exit. There was substantial depth with which the community could identify challenges to a teacher's success and their subsequent eagerness to help teachers work around and through challenges. Interestingly, the community influencers saw communication as the way around imposed challenges. Influencers were not asking the SBAE teacher to take on challenges for themselves, they simply acknowledged they existed. Influencers saw themselves better positioned to aid in rejecting positions of challenge than their SBAE teachers.

Implications & Recommendations

These teachers (SBAE and not) expressed the benefits of changing schools, corroborating previous work in this area (Haddad et al., 2019). However, this study also brought penalties on teacher mobility to light. If mobility remains the only means by which teachers can better their situation, greater attention must be given to accommodating moves. In this way, we will see local interaction subscribing to broader discourses. While the findings from our study focused on a small, localized sample, our participants subscribed to discourses with broader implications for considering the teaching career. Caleb, who has moved multiple times over his career, recognized his local experience was evidence of a structural challenge:

It's a dumb system... Imagine if it was not just all these independent districts. You can still be independent districts, but if the seniority list was just, "Hey, here you go. There's an opening coming up," so I'll say, "[Principal], would you like to move there instead?"

The impacts of teacher mobility on student achievement were statistically clear in the literature (Atterbury et al., 2017; Feng & Sass, 2012; Gary, Taie, & O'Rear, 2015; Goldring et al., 2014; Ronfeldt et al., 2012; Ross et al., 1999). Our community influencer participants recognized similar challenges as they attempted to hold program pieces together despite mobility. While this is not a call to incentivize teacher mobility, greater attention needs to focus on the policy level not to punish it. To Caleb's comment, the detriments of mobility on teachers remain unexplored. In recognizing the challenge of identifying the *right things* between the participants in our study, reconsidering how experience is acknowledged may support steps toward reduced impacts on students, teachers, and communities. Cycles of mobility will continue to impact the hardest hit students if salaries do not reflect a value on teacher experience at the school district level.

Teachers and community influencers positioned SBAE teachers as overworked. However, the expectation for robust FFA programs and continued growth of the SBAE program was also present, particularly from community influencers. SBAE teachers conveyed these expectations as desires to grow programs as visionaries in their field. In aligning with findings in the *Conflicting Requirements* theme, FFA and SAE must be identified as integral parts of the SBAE teacher contract and job duties. This establishes the desired position at hire related to the *right things*. Clarity in expectation aids in managing SBAE teachers' workload. This role likely extends beyond the roles of participants in our study and may need to include considerations for school board and superintendents to be contractually clear with the SBAE teacher relative to the

job they are to carry out. Notably, school boards are uniquely positioned *in the community*, and clarity in contracts would aid community influencers in appropriately grounding expectations against what growth will be supported in the school.

Resource limitation also imposed significant challenge throughout this study. Resources of time and money were difficult to navigate as one often enacted the other. Community influencers could see how busy their SBAE teachers were and tried to help by providing additional funding. While time and money imposed constraints on each other, there was also potential for time and money to offset each other. Teachers in CTE areas spent additional time writing grants to secure available money to acquire available resources. This situation, anecdotally, is not unique to this study, though continued research may seek to ascertain how CTE teachers structure their time. This is a vicious cycle of making money available without alleviating time constraints. Apart from securing funding, participants identified a challenge in time to implement. A teacher could not use available resources if they were overworked. Those in positions of teacher support were quick to generate and supply missing resources, but teachers indicated resource saturation. In addition, teachers were asked to add tracking and communicating their workload to an already full plate. Additional staff, delegated support, or compensation for the added logistical load SBAE teachers carry is necessary.

Recommendations from Community Influencers for Mobile Teachers

Community influencers shared several key recommendations for the mobile teachers in this study. Ben and Caleb both strongly encouraged teachers to challenge themselves and be selective and evaluative in considering future positions. For both the new teacher and the mobile teacher, however, the key consideration seemed to be geography, as identified by several of the participants and corroborated by the state supervisor, “Especially with first year teachers, everybody wants to go home.” Community influencers recognized the difficult role a SBAE teacher occupies. They also offered substantial help and support to aid in managing the workload, and in fact, influencers saw their positions rejected if the assistance was not accepted. Caleb gave an example of his former principal knowing how the auto tech teacher engaged local businesses to determine his curriculum. This example identified a teacher sharing the workload of developing relevant curriculum with an industry partner who already had the pre-requisite expertise, reducing the workload on the teacher, and establishing a community influencer in the process.

Underlying these implications, based on the data presented here, was a key understanding related to working with community influencers: they sought engagement. Despite being busy survivors themselves, they were eager to be involved. Community influencers were willing and able to provide much greater leverage to a total SBAE program including financial stability, institutional knowledge, content expertise, facilitation of community connectedness, support for challenging students, and input and visioning for forward progress of the program. If this appears overzealous, we ask SBAE teacher readers to keep in mind a community’s investment in the success of local agriculture. Community influencers expressed engaging with the local SBAE program as carrying out a mission for local agricultural success. This required a reification from SBAE teachers of serving a community well acquainted with hard work. While community influencers did not expect anything to be difficult for the sake of difficulty, they expected others

to rise to the challenge for which they were hired. SBAE teachers' willingness and ability to return others' investment was essential to establishing a position of support.

Recommendations from Mobile Teachers for Community Influencers

Teachers expressed several desires in connection from their administrators, validating connection already occurring and seeking additional points of support, including regular check ins, support for continued development of pedagogical content knowledge, mentoring relationships, supplies to do the job, schedule accommodations, follow through on classroom management issues, classroom autonomy, and time to connect with fellow staff members. Aaron emphasized these as important to his role as administrator, particularly in his context as a former agriculture teacher. The reminder for administrators is to maintain accountability in mistakes. Allow them, but enforce clear, reasonable, and consistent expectations at all levels.

Curricular resource availability did not seem to be the issue for these teachers. Provided enough chairs, teachers suggested they had the material resources they needed to perform the tasks of their job. The biggest resource they were lacking, however, was time. Stephanie identified time to collaborate and plan as two foremost factors inhibiting program growth. Stephanie expressed the challenge of implementing resources when she was too overworked and stressed to sort through them. Aaron and Stephanie both expressed the overwhelming nature of sorting through available resources to find what would work for their program. The limit, rather than resources themselves, was cost, time to implement, or time to secure funding to cover the cost, particularly for resources to expand program offerings.

Teachers expressed concern over knowing how and who to ask for help. Employing opportunities to grow preservice teachers' comfort in asking for assistance could be an essential skill as early-career teachers seek program fit. Apart from seeking human resources, deploying human capital and delegating were vital tasks for teachers' success. However, these teachers had limited capacity to organize resource deployment, despite available assistance. Integrating opportunities for communication and public relations plans, or community engagement plans, in pre-service programs provides a starting point for early-career teachers to capitalize on and secure resources in their communities. Engaging a culture of questions continues work already in progress to build a culture of learning in pre-service and early-career teachers. This further acknowledges teaching as a learning profession and confirms the advice from community influencers regarding the practice and support needed to become an effective educator.

Conclusions & Implications

These themes culminated in an interactional *work cycle* of a person who will one day take the place of another. The predominant discourse reified here tells SBAE teachers they owe it to themselves to put in the extra work now to be compensated for it later. Aaron and Stephanie corroborated this discourse. Teachers across SBAE engage in this cyclic mentality to find little reward at the end (Traini et al., 2019). Therefore, it is essential SBAE teachers consider the *work cycle* in terms of what they leave for the next person. Can someone replace you? What will the community expect of the next SBAE teacher based on the *right things* you are doing?

The context of teacher mobility presented positions within the constructs of support and challenge. SBAE teacher mobility, through a positioning lens, exposed a pinch point of school and system wide challenges in education as communities worked to position someone new. Lastly, *migration* implies a pattern of movement. By explicating breakdowns in support and perceived challenges, this study laid the foundation for exploring pinch points in the teaching career to identify patterns. Mobility work helps us explicate what teachers move away from, systemically, to better allow us to focus on the structures that support the teaching career.

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Describing Instructional Method Use for Early, Middle, and Late Career Stage School-based Agricultural Education Teachers

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Abstract

Instructional methods are the cornerstone of all teaching and learning strategies. This study explored instructional method use by early, middle, and later career agricultural education teachers. One-hundred nine teachers responded to an online questionnaire. These teachers were evenly split in terms of gender and more than three to one were traditionally certified versus alternatively certified. Cooperative learning, demonstration, and lecture were reported as the most frequently used instructional methods across the career stages. Demonstration, discussion, and lecture were the instructional methods in which teachers reported having the most training. Teachers in this study were most confident in using demonstration and least confident in using role play. Demonstration and role play both held the top and bottom spots when teachers were asked about effectiveness related to their instructional methods. Several moderate to strong relationships exist between perceived confidence in using instructional methods and the effectiveness of the given instructional method. Framing instructional method use as a line of inquiry is important within the agricultural education discipline as we continue to see an increase in alternative certification teachers entering the profession and as a lens to study changes in agricultural education teachers throughout their careers.

Introduction

School-based agricultural education (SBAE) teachers have numerous responsibilities including providing classroom and laboratory instruction, advising a local FFA chapter, supervising agricultural experiences, and many others (Phipps et al., 2008; Talbert et al., 2022). Arguably, providing classroom and laboratory instruction is one of the most important roles of an effective SBAE teacher (Roberts & Dyer, 2004). Directly related to providing instruction is the task of selecting a teaching or instructional method to deliver technical content to students. Furthermore, the American Association for Agricultural Education (2017) lists pedagogical content knowledge as their first standard in the standards for SBAE teacher preparation programs. One of the performance indicators for this standard is demonstration of a variety of teaching methods, providing the focus for this study (American Association for Agricultural Education, 2017).

According to Rosenshine and Furst (1971), one of the fundamental characteristics of an effective teacher is the ability to provide variability in instructional methods. For students, using differing instructional methods can be one of the strongest factors influencing attention, learning, and retention (Dean et al., 2012; Sallee et al., 2013). While use of varying instructional methods is an important characteristic from both the student and teacher perspectives, researchers have indicated practicing SBAE teachers continue to need professional development in this area, even

after completing certification through their teacher preparation program (DiBenedetto et al., 2018; Duncan et al., 2006; Thornton et al., 2020). Smith and Smalley (2018) found teachers perceived to have a moderate level of stress related to providing instruction, further indicating this is an area in which teachers may need help.

When examining professional development needs of SBAE teachers, we know needs can vary depending on the career stage of the teacher (Smalley & Smith, 2017; Sorensen et al., 2014; Thornton et al., 2020). In fact, the National Association of Agricultural Educators (2016) has recommended tailoring professional development for early, middle, and late career SBAE teachers to better meet their individual needs. This sentiment was echoed in a study recommending a variety of professional development opportunities be designed and provided for SBAE teachers based on their level of experience (DiBenedetto et al., 2018). Continuing professional development for all career stages has the potential to increase resiliency and decrease burnout for SBAE teachers (Smith & Smalley, 2018).

Several studies have described how SBAE teachers use various instructional methods, however they have been limited in their context to particular groups or career stages of teachers (Colclasure et al., 2022; Smith et al., 2015; Voges et al., 2020). The identification of specific topics and curricular areas of weakness has been recommended along with the identification of professional development needs for SBAE teachers with different levels of experience (Easterly & Myers, 2017; Solomonson et al., 2021). However, before a formal needs assessment is conducted, a general description of instructional method use by SBAE teacher career stage is necessary, giving rise to the need for this study.

Theoretical Framework and Literature Review

The theoretical framework that guided this study was the application of Bandura's (1997) perceived self-efficacy theory to Huberman's (1989) professional life cycle of teachers. Self-efficacy can be defined as one's beliefs in their ability to organize and implement actions to learn or perform behaviors (Bandura, 1997). Self-efficacy beliefs can affect behaviors such as choice of tasks, effort expenditure, and skill attainment (Schunk, 1991). In our study, the behavior would be the use of a particular instructional method. Research has shown that higher levels of perceived self-efficacy toward instructional methods can lead to more successful use of those methods (Caprara et al., 2006; Smith et al., 2015). However, the relationship between self-efficacy and behavior can be reciprocal since effective teaching behaviors can influence teachers' self-efficacy beliefs (Bandura, 1997; Klassen & Chiu, 2011).

Research indicates self-efficacy can wane over time or over an individual's career (Bandura, 1997). This leads to the use of Huberman's professional life cycle of teachers. Huberman's (1989) model divides teachers into three career stages: novice, mid-career, and late-career. According to Huberman, teachers in the novice career stage have a focus on survival followed by concentration on teaching and impacting students. Mid-career teachers are characterized more by stabilization in their career, experimentation in the classroom, and taking stock and sometimes

having self-doubt in their own work. Late-career teachers can experience serenity or disengagement with the approach of retirement (Huberman, 1989). Huberman loosely tied each career stage to years of experience, as have others. For the purposes of this study, we defined SBAE teachers with one to five years of experience as early career teachers, those with six to 15 years of experience were considered middle-career, and those with 16 or more years of experience were considered late career teachers (Roberts et al., 2020; Solomonson et al., 2021).

When examining the literature on teacher career stages and perceived self-efficacy, a general trend of increasing self-efficacy during the early career stage is followed by peak self-efficacy during the middle career stage (Klassen & Chiu, 2010; Klassen & Chiu, 2011; McKim & Velez, 2015). Declines in teacher self-efficacy are then observed during the late career stage (Klassen & Chiu, 2010; McKim & Velez, 2015). The decline in self-efficacy has not only been observed in teachers but in business management employees as well (Lawrence, 1988). To help improve self-efficacy, it has been recommended professional development continue throughout all career stages (Guthrie & Schwoerer, 1996; Klassen & Chui, 2011). However, this is not always well received by those in late career stages, as they may not believe they can succeed in the training or that new training will not be useful (Guthrie & Schwoerer, 1996). Continued confidence in teaching is important at all career stages because higher levels of self-efficacy in teaching is linked to higher career commitment (Solomonson et al., 2021; Whittington et al., 2006).

Literature related to self-efficacy in teaching and career stages in SBAE is limited. However, Solomonson et al. (2021) reported early career teachers lacked teaching confidence while later career teachers were confident in their teaching ability. Smith and Smalley (2018) reported mid-career teachers were more confident in using various instructional methods. Similarly, professional development needs related to pedagogy and classroom instruction have been identified for early and middle career teachers with higher needs in the early career stage (Roberts et al., 2020; Smalley & Smith, 2017; Sorensen et al., 2014).

Specific instructional methods used by SBAE teachers has been documented by researchers, however information on this topic specific to career stage is sparse. Colclasure et al. (2022) concluded age is not related to the quantity of time instructional methods are used. However, reported confidence in using specific instructional methods was related to higher perceived effectiveness of those instructional methods. Higher perceived effectiveness of instructional methods was also associated with higher quantities of time using the instructional methods (Colclasure et al., 2022). According to Smith et al. (2015), differences in perceived effectiveness was observed between male and female teachers with males ranking supervised study higher than females and female teachers ranking role play higher than their male counterparts.

Literature on instructional method use among SBAE teachers indicated, lecture was reported as being used most often by all career stages combined, while role play was reported as being used least (Colclasure et al., 2022; Smith et al., 2015). A study of early career teachers found demonstration was used the most and guest speakers were used the least (Voges et al., 2020). Teachers in the early career stage and all career stages combined reported highest perceived

effectiveness for demonstration and lowest for role play (Colclasure et al., 2022; Voges et al., 2022). Early career teachers reported having the highest confidence in using demonstration while all career stages had the most confidence in lecture (Smith et al., 2015; Voges et al., 2020). By examining results of these studies, it can be concluded there may be differences in use, confidence, and perceived effectiveness of instructional methods based on career stage.

In summary, SBAE teachers spend the largest portion of time in classroom and laboratory teaching activities when compared to all other duties (Torres et al., 2008). This has been observed in greater amounts for late career SBAE teachers compared to early career SBAE teachers (Smith & Smalley, 2018). However, specific information related to how SBAE teachers use and perceive specific instructional methods by career stage is lacking. To explore how professional development can be structured for each career stage, this information is needed.

Purpose and Objectives

The purpose of this study was to describe instructional method practices, perceptions, and confidence of SBAE teachers in early, middle, and late career stages. The objectives that guided this study were:

1. Determine training received for various instructional methods according to career stage.
2. Describe time spent using various instructional methods according to career stage.
3. Describe confidence in using various instructional methods according to career stage.
4. Describe perceived effectiveness of using various instructional methods according to career stage.
5. Describe relationships between time spent using instructional methods, perceived confidence, and perceived effectiveness for various instructional methods by career stage.

Methods

To accomplish the purpose and objectives of this study, we employed a descriptive, survey design. According to Fraenkel et al. (2023), quantitative, descriptive surveys are used to summarize characteristics of individuals or groups. The groups we sought to describe were early, middle, and late career SBAE teachers in Texas. Our accessible population was all SBAE teachers who were members of the state agriculture teachers association ($N = 2,172$). According to Krejcie and Morgan (1970), a sample of 326 teachers was needed to describe the population. However, due to anticipated low response rates, this number was doubled ($n = 652$) for sample selection. Using the directory from the state agriculture teachers association, simple random sampling was used to select participants and create an email contact list.

The questionnaire used for this study was replicated with permission from authors of previous studies (Smith et al., 2015; Voges et al., 2020). Their questionnaire assessed training received, usage, confidence, and perceived effectiveness for 10 instructional methods identified from Newcomb et al. (2004). To assess training received, participants were asked if they had received training through their certification program on each instructional method with the opportunity for

a yes/no response (10 items). Data for time spent using each instructional method were collected by asking participants to use a slider to estimate the percentage of class time per year that each instructional method was used (10 items). The sliders automatically totaled 100% for all 10 instructional methods combined. Confidence in using each instructional method was rated on a scale of 1 = *Very Low Confidence* to 5 = *Very High Confidence* (10 items). Perceived effectiveness of each instructional method was rated on a scale of 1 = *Very Ineffective* to 5 = *Very Effective* (10 items). Six demographic questions were included at the end of the questionnaire for a total of 46 items. With the exception of the demographic section, definitions adapted from Newcomb et al. (2004) were provided for the 10 instructional methods for each of the four main sections of the questionnaire. Definitions are presented in Table 1.

Table 1
Definitions of Instructional Methods Provided to Participants

Method	Definition
Cooperative Learning	Learner-centered instruction in which groups of 3-5 students work together on a well-defined learning task.
Demonstration	Teacher-led instruction of hands-on skills or activities.
Discussion	Two-way communication about a pre-defined topic conducted with the entire class or smaller groups of students.
Experiments	Students using the scientific method to form hypotheses, test theory, and formulate conclusions on a given topic.
Field Trips	Students taken away from traditional classroom setting for real-world experience in a content area.
Guest Speakers	Guests with particular expertise are brought in to instruct about a specific concept or topic.
Independent Study	Students are engaged in self-directed learning of a topic specific to their interests.
Lecture	Teacher-led instruction for disseminating information, may be guided through multimedia presentation.
Role Play (skits)	Class participants play or portray a given role to illustrate a concept.
Supervised Study	Given a well-defined question or prompt, students use resource materials to find answers themselves.

Researchers from previous studies using the questionnaire determined it to be valid and reliable (Smith et al., 2015; Voges et al., 2020). However, two professors of agriculture teacher education with experience in teaching courses in instructional methods reviewed the questionnaire for

content validity. Based on the purpose and objectives of this study, they believed items in the questionnaire would accurately measure the information we wanted to collect. Since our questionnaire was administered to the same population as was used in the study conducted by Voges et al. (2020), a pilot test was not conducted and their reported reliability of .80 was deemed acceptable (Field, 2018).

After Institutional Review Board (IRB) approval was obtained from Texas A&M - Commerce in mid-May, an initial email requesting participation was distributed to participants through Qualtrics with a link provided to the online questionnaire. Following Dillman’s tailored design method, four reminder emails were sent soliciting response (Dillman et al., 2014). Reminder emails were sent at one-week intervals with varying messages tailored to maximize response. Data collection was concluded in late-June with a total of 109 completed questionnaires for a 16.72% response rate.

To test for nonresponse bias, a comparison of early to late respondents was conducted for each scale item (Lindner et al., 2001). Early respondents ($n = 91$) were those who answered in the first two rounds of emails and late respondents ($n = 18$) were defined as those responding starting with the third email or after. After conducting independent samples t -tests, no significant differences were found. However, this comparison lacked statistical power to detect differences, even with a large effect size (Johnson & Shoulders, 2017). Therefore, we do not recommend readers generalize results beyond the sample of respondents in this study. All data collected through the Qualtrics survey platform were exported into a Microsoft Excel spreadsheet. Data were analyzed in SPSS version 28.0. Basic descriptive statistics such as frequencies, percentages, means, standard deviations, and correlations were calculated to meet the objectives of this study.

Findings

Of the 109 teachers responding to the survey, 30 teachers were considered to be in the early career stage, 36 teachers were in the middle career stage, and 43 teachers were in the late career stage. When describing the demographic characteristics of our study participants, the overall average age was 38.73 ($SD = 11.43$) years. More specifically, respondents in the early career stage had an average age of 27.13 ($SD = 4.65$) years, those in the middle career stage had an average age of 36.61 ($SD = 7.75$) years, and late career teachers had an average age of 48.60 years ($SD = 8.44$). There were nearly equal numbers of male ($n = 54, 49.54\%$) and female ($n = 52, 47.71\%$) respondents. A majority of respondents ($n = 86, 78.90\%$) reported earning certification traditionally through an in-person university teacher preparation program. Further breakdown of respondent demographic characteristics is presented by career stage in Table 2.

Table 2
Demographic Characteristics of Participants (N = 109)

Characteristic	Early (n = 30)		Middle (n = 36)		Late (n = 43)		Overall (N = 109)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Sex								

Male	12	40.00	11	30.56	31	72.09	54	49.54
Female	17	56.67	24	66.67	11	25.58	52	47.71
Certification Type								
Traditional	22	73.33	27	75.00	37	86.05	86	78.90
Alternative	8	26.67	9	25.00	6	13.95	23	21.10

Note. Percentages may not total to 100% due to item nonresponse.

The first objective of this study was to determine training received for instructional methods according to career stage SBAE teachers. Early career teachers most frequently reported receiving training through their teacher preparation program for demonstration, discussion, and lecture ($f = 29$, 96.67%). Middle career teachers reported receiving training in cooperative learning, demonstration, and lecture most frequently ($f = 44$, 94.44%). Training for lecture ($f = 42$, 97.67%) and discussion ($f = 40$, 93.02%) was reported most frequently for late career teachers. Training for using the role play instructional method had the lowest frequency for teachers in all three career stages. Refer to Table 3 for further information on training received for instructional methods broken down by career stage.

Table 3

Frequency of Training Received for Instructional Methods by Career Stage (N = 109)

Instructional Method	Early ($n = 30$)		Middle ($n = 36$)		Late ($n = 43$)	
	f	%	f	%	f	%
Cooperative Learning	28	93.33	34	94.44	34	79.07
Demonstration	29	96.67	34	94.44	38	88.37
Discussion	29	96.67	33	91.67	40	93.02
Experiments	22	73.33	23	63.89	28	65.12
Field Trips	19	63.33	14	38.89	26	60.47
Guest Speakers	22	73.33	19	52.78	27	62.79
Independent Study	24	80.00	25	69.44	27	62.79
Lecture	29	96.67	34	94.44	42	97.67
Role Play	17	56.67	13	36.11	18	41.86
Supervised Study	23	76.67	20	55.56	31	72.09

Note. Percentages are based on total number of respondents in each career stage.

Objective two was to describe time spent using various instructional methods according to career stage. This was an estimate of the percentage of time spent using each method for all courses taught over a school year and is summarized in Table 4. Early and late career teachers reported using cooperative learning the most with an average of 20.00% ($SD = 13.12$) and 27.88% ($SD = 21.86$) respectively. Middle career teachers spent the most time using lecture ($M = 20.47$, $SD = 13.78$). Role play was used least by all three career stage groups.

Table 4

Average Time Spent Using Instructional Methods by Career Stage (N = 109)

Instructional Method	Early ($n = 30$)		Middle ($n = 36$)		Late ($n = 43$)	
	M	SD	M	SD	M	SD
Cooperative Learning	20.00	13.12	18.86	11.18	27.88	21.86

Demonstration	17.97	11.44	17.53	11.44	23.05	13.55
Discussion	14.57	7.75	11.94	7.82	12.47	8.66
Experiments	6.57	7.99	7.17	7.74	5.21	5.43
Field Trips	2.30	5.40	3.14	5.85	2.02	3.27
Guest Speakers	1.60	3.95	1.64	2.55	2.12	2.83
Independent Study	7.13	7.36	9.33	8.81	5.65	8.65
Lecture	19.07	12.01	20.47	13.78	15.21	13.49
Role Play	0.83	2.07	1.00	2.44	0.79	1.81
Supervised Study	9.97	10.28	8.92	8.66	5.60	7.58

Note. Average time spent using teaching methods is based on estimated percentages of the school year.

The third objective of this study was to describe confidence in using various instructional methods according to career stage. Early and late career stage teachers reported the highest average confidence in using the demonstration instructional method with a mean of 4.32 ($SD = 0.66$) and 4.43 ($SD = 0.58$) respectively. Middle career teachers were most confident in using lecture ($M = 4.29$, $SD = 0.70$). Teachers had the least confidence in using role play for all three career groups. Refer to Table 5 for a complete breakdown on confidence in using instructional methods by each of the three career stages.

Table 5

Confidence in Using Instructional Methods by Career Stage (N = 109)

Instructional Method	Early ($n = 30$)		Middle ($n = 36$)		Late ($n = 43$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Cooperative Learning	3.95	0.96	4.00	0.85	4.18	0.78
Demonstration	4.32	0.66	4.21	0.56	4.43	0.58
Discussion	4.12	0.78	3.92	0.83	4.00	0.67
Experiments	3.33	1.03	3.21	0.94	3.38	0.95
Field Trips	3.30	1.10	3.64	0.89	3.43	1.14
Guest Speakers	3.32	1.09	3.64	0.81	3.42	1.23
Independent Study	3.44	1.00	3.29	1.16	3.38	1.21
Lecture	4.11	0.72	4.29	0.70	4.00	0.84
Role Play	2.18	1.10	3.00	1.13	2.60	1.24
Supervised Study	3.47	1.04	3.50	1.05	3.67	0.84

Note. Scale: 1 = *Very Low Confidence* to 5 = *Very High Confidence*.

For the fourth objective, teachers described their perceived effectiveness of each instructional method. Teachers in all three career stages viewed demonstration as the most effective instructional method and role play as the least effective instructional method. Table 6 provides a summary of perceived effectiveness for the 10 instructional methods by teacher career stage.

Table 6

Perceived Effectiveness of Instructional Methods by Career Stage (N = 109)

Instructional Method	Early ($n = 30$)		Middle ($n = 36$)		Late ($n = 43$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>

Cooperative Learning	4.03	0.73	3.69	0.82	4.10	0.88
Demonstration	4.17	0.71	4.14	0.76	4.31	0.69
Discussion	3.75	0.65	3.67	0.69	3.82	0.79
Experiments	3.79	0.82	3.61	0.96	3.79	0.83
Field Trips	3.52	1.12	3.47	1.05	3.41	1.04
Guest Speakers	3.10	1.11	2.94	1.07	3.18	0.85
Independent Study	3.03	0.94	2.97	0.81	3.33	1.06
Lecture	3.31	0.60	3.17	0.88	3.26	1.04
Role Play	2.69	0.85	2.39	1.20	2.82	1.12
Supervised Study	3.38	1.01	3.28	0.81	3.67	0.93

Note. Scale: 1 = *Very Ineffective* to 5 = *Very Effective*.

The final objective of this study was to describe relationships between time spent using instructional methods, perceived confidence, and perceived effectiveness for each instructional method by career stage. Table 7 presents correlations between time spent using each instructional method and perceived confidence in using the methods by career stage. Correlations were negligible to substantial (Davis, 1971) for early and middle career teachers and negligible to moderate for late career teachers. Early career teachers had substantial correlations between perceived confidence and time spent using cooperative learning ($r = .58$) and supervised study ($r = .55$). Middle career teachers had substantial correlations between perceived confidence and time spent using experiments ($r = .51$) and cooperative learning ($r = .50$).

Table 7

Correlations Between Time Spent and Perceived Confidence of Methods (N = 109)

Instructional Method	Early (r)	Middle (r)	Late (r)
Cooperative Learning	.58	.50	.45
Demonstration	.29	.26	-.04
Discussion	.03	.48	.15
Experiments	.47	.51	.14
Field Trips	.42	.30	.25
Guest Speakers	.38	.01	.38
Independent Study	.25	.28	.45
Lecture	.42	.38	.10
Role Play	.38	.49	.28
Supervised Study	.55	.44	.37

Relationships between perceived effectiveness and time spent using each method revealed substantial correlations for early career teachers with supervised study ($r = .65$) and cooperative learning ($r = .56$). For middle career teachers, a substantial correlation was found for discussion ($r = .64$). All correlations for late career teachers were negligible to moderate. This information is summarized in Table 8.

Table 8

Correlations Between Time Spent and Perceived Effectiveness of Methods (N = 109)

Instructional Method	Early (r)	Middle (r)	Late (r)
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Cooperative Learning	.56	.32	.48
Demonstration	.40	.25	.18
Discussion	.04	.64	.02
Experiments	.35	.37	.18
Field Trips	.27	.28	.25
Guest Speakers	.22	-.03	.26
Independent Study	.49	.26	.29
Lecture	.14	.46	.41
Role Play	-.12	.47	.31
Supervised Study	.65	.27	.40

Finally, correlations between perceived confidence and perceived effectiveness yielded moderate to very strong associations for all career stages and all instructional methods with the exception of role play ($r = .23$) for early career teachers and supervised study ($r = .28$) for middle career teachers. The strongest relationship between confidence and perceived effectiveness for early career teachers was with supervised study ($r = .71$), role play ($r = .77$) for middle career teachers, and guest speakers ($r = .79$) for late career teachers. Table 9 presents a complete summary of correlations between perceived confidence and effectiveness for each instructional method.

Table 9
Correlations Between Perceived Confidence and Effectiveness of Methods (N = 109)

Instructional Method	Early (r)	Middle (r)	Late (r)
Cooperative Learning	.45	.62	.69
Demonstration	.30	.56	.52
Discussion	.25	.69	.41
Experiments	.31	.46	.69
Field Trips	.34	.61	.78
Guest Speakers	.30	.64	.79
Independent Study	.30	.21	.62
Lecture	.44	.53	.37
Role Play	.23	.77	.67
Supervised Study	.71	.28	.53

Conclusions, Implications, and Recommendations

The purpose of this study was to describe instructional method practices, perceptions, and confidence of SBAE teachers in early, middle, and late career stages. Data from the first objective described training received for using instructional methods by career stage. Over 90% of early and middle career teachers received training in cooperative learning, demonstration, discussion, and lecture. Training was reported more frequently for eight of the 10 instructional methods for early career teachers when compared to late career teachers. Although, middle and late career stage teachers are further removed from the original training in their teacher preparation program making it more difficult to remember if specific training was received.

For the second objective, instructional method use was described for each career stage. Teachers from each career stage in this sample reported using experiments, field trips, guest speakers, independent study, role play, and supervised study less than 10% of the time. This aligns with findings of previous studies on the same methods (Smith et al., 2015; Voges et al., 2020). Early career and late career teachers reported using cooperative learning for the greatest percentage of time while middle career teachers used lecture most often. This finding differs from those of previous studies where lecture was used most often, indicating teachers at different career stages may use different instructional methods (Colclasure et al., 2022; Smith et al., 2015). For all career stages, the use of role play was reported least often followed by either guest speakers or field trips highlighting the continued low use of these methods (Colclasure et al., 2022; Smith et al., 2015; Voges et al., 2020).

Findings on confidence in using instructional methods by career stage revealed middle career teachers in this sample were only more confident than early and later career teachers in their ability to use field trips, guest speakers, lecture, and role play. This differed from expectations based on previous self-efficacy studies related to career phases where mid-career teachers had higher self-efficacy than those in early and late career stages (Klassen & Chiu, 2010; Klassen & Chiu, 2011; McKim & Velez, 2015). Given this finding, self-efficacy in using certain instructional methods may peak at different times and is not necessarily related to age (Colclasure et al., 2022). The highest confidence reported was with late career teachers using demonstration while the second highest was also with demonstration but with early career teachers. Moderate to high confidence was reported for all instructional methods and by all career stages with the exception of role play where low confidence was reported for both early and late career teachers, aligning with findings of previous studies (Colclasure et al., 2022; Voges et al., 2020).

The fourth objective described perceived effectiveness of each instructional method by career stage. Teachers in this sample reported highest perceived effectiveness for demonstration and least for role play across all career stages, coinciding with previous findings (Colclasure et al., 2022; Voges et al., 2020). A finding of note was that late career teachers viewed all instructional methods as being more effective than their early and middle career counterparts with the exception of field trips and lecture. Middle career teachers reported the lowest perceived effectiveness scores for every method except field trips when compared to other career stages.

In the final objective, correlations were used to describe relationships between time spent, confidence, and perceived effectiveness of each instructional method by career stage. When examining time spent and confidence in using each method, late career teachers in this sample had weaker correlations in seven of the ten instructional areas, indicating the two variables are not as strongly tied to each other during the late career stage. This would not be expected according to Schunk (1991) where higher self-efficacy beliefs can affect choice of task. Although, moderate correlations with time and confidence were generally observed for each instructional method for early and middle career SBAE teachers. While beyond the scope of this

study, lower correlations between these variables may be a sign of disengagement described by Huberman (1989) for late career teachers.

Correlations between time spent using instructional methods and perceived effectiveness had mixed results based on career stage. Substantial correlations were found for early career teachers in using cooperative learning and supervised study, while middle career teachers had a substantial correlation for discussion. Generally, correlations were low to moderate between time spent using instructional methods and their perceived effectiveness. While these variables were related for this sample, there does not appear to be any notable differences based on career stage.

When examining correlations between perceived confidence and effectiveness of instructional methods, over half the relationships were substantial or strongly associated, aligning with findings of Colclasure et al. (2022). Also, all but one of the substantial and strong associations were with middle and later career teachers. This may indicate that as teachers progress through their career, beliefs about each teaching methods become more solidified. This is supported by Huberman's (1989) model where stabilization occurs during the middle career stage.

Associations between confidence and effectiveness were generally lower for early career teachers with the exception of supervised study. This instructional method is a hands-off approach and may be easier for early career teachers to use when they are focusing on survival.

Practical recommendations can be made from the findings and conclusions of this study. First, teacher preparation programs should continue providing instruction on a wide variety of instructional methods for preservice teachers and possibly offer refresher training for late career teachers. The use of role play continued to show a lack of use by SBAE teachers in this study. Perhaps professional development on how to use this instructional method for teachers in all career phases should be offered. When providing professional development on instructional methods, consideration should be given to career stage (National Association of Agricultural Educators, 2016). To meet teachers where they are, we should refer to self-efficacy and perceived effectiveness data to tailor professional development opportunities more effectively.

A limitation of this study was generalizability beyond this sample. Future studies should obtain a more generalizable sample and go a step further to identify predictors of instructional method use. Perceived effectiveness and confidence does not necessarily relate to use of particular instructional methods as found in the findings from this study. However, this relationship is reciprocal and one variable does not necessarily cause the other (Bandura, 1997). Other variables are likely influencing the decision to use each instructional method. It also seems instructional method beliefs became more solidified with age. Given this information, future studies may identify ways to influence these beliefs in the early to middle career stages so that a wider variety of instructional methods is used more often. Finally, future studies should continue to identify needs of SBAE teachers through the lens of career stage so teachers can be better supported over a full career.

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Measuring Mobility: A Quantitative Description of Mobility in Minnesota

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Abstract

Understanding the teaching workforce necessitates an understanding of the various ways teachers make a career of teaching. Given the significant staffing challenge currently facing schools across the United States, and especially in hard to staff areas such as CTE pathways, additional effort is needed to understand the nuance of the career options available to do this. One such option is mobility; an option this study seeks to examine for Minnesota. We sought to describe SBAE mobility in our state, both for the individual by years' career experience and time in program, and in terms of school level turnover. We found a higher frequency of exit post-program move in our study compared to previous state level examination. We also found very few schools retaining SBAE teachers for a 20-year career. These findings allow us to discuss implications related to congruence and broader career considerations related to retention.

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Introduction

Teacher retention is arguably one of the greatest issues facing education throughout the last decade (Palma-Vasquez et al., 2022). The most recent school pulse panel reported 53% of United States schools felt understaffed entering the 2022-2023 school year (IES, 2022). *Instability* in the teacher workforce can limit resources and divert schools' focus from educational advancements (Palma-Vasquez et al., 2022), particularly in already disadvantaged schools (Goldhaber & Theobald, 2022; Williams et al., 2021). *Workforce instability* is the flux incited by factors leading to teacher vacancies. Such challenges are further compounded as less experienced teachers replace more experienced peers (Feng & Sass, 2012; Haddad et al., 2021; Ingersoll & Smith, 2003). At the school level, workforce instability may take the form of teacher attrition, evidenced by teachers leaving the profession, or teacher mobility, manifested by teachers moving to a different school (Palma-Vasquez et al., 2022).

To address issues related to teacher attrition and increase teacher retention, we must move beyond the current research conversation. Current School-Based Agricultural Education (SBAE) research tends to primarily focus on individual characteristics of those who stay, move, and leave (Igo & Perry, 2019; Lemons et al., 2015; Solomonson & Retallick, 2018; Solomonson et al., 2019; Solomonson et al., 2021; Solomonson et al., 2022; Sorensen et al., 2016) while failing to explore the implications of individual choice on a broader profession and vice versa. Within SBAE, licensed teachers made up approximately 85% of 1680 new hires nationwide in 2021 (Smith et al., 2022). While only 674 (5% of a 13,349 SBAE teaching force) left SBAE

teaching, continued growth in SBAE meant vacant positions remained, even as a new school year began (Smith et al., 2022).

Even in addressing the schools in which teachers work, much of the literature in SBAE, and in education more broadly, focuses on alleviating teacher attrition by applying solutions based on addressing teacher characteristics. The literature identifies opportunities for professional development in content, while encouraging teachers to develop in the personal characteristics associated with career longevity (Haddad et al., 2022). Vagi and Pivovarova (2016) corroborate this within the education field at large. Specific characteristics of those who remain teaching and those who leave teaching receive attention, and attempted solutions manifest based on developing specific characteristics in teachers or schools (Vagi & Pivovarova, 2016). Vagi and Pivovarova (2016) advocate for a more nuanced approach to issues of teacher retention, asking us to consider teaching as a career composed of complex decisions.

Recognizing the need to consider teaching as a career comprised of complex decisions, we sought to outline the 25-year condition of the SBAE teacher workforce in Minnesota. For Minnesota, 54% of beginning agriculture teachers were retained over a 25-year period, noting 88% retention rates between year one and two (Rada et al., 2021). Despite the high retention rate in SBAE, one third of the teaching population had changed schools at least once (Rada et al., 2021). While we consider this a win for the broader SBAE profession, schools and communities still struggle from losing these teachers. Considering retention in terms of the teacher and program provides a more complete picture of SBAE retention and gives valuable insight into the general state of the profession. To that end, our study seeks to outline Minnesota teacher mobility and the school level attrition it leaves in its wake.

In preparing for our study, we found ourselves asking: Do SBAE programs in Minnesota schools experience the strains from workforce instability noted in the literature? Are SBAE teachers who change schools or leave teaching replaced with equally experienced teachers? What is the school level SBAE retention rate in Minnesota? These questions led to the current examination of the challenging implications of teacher retention for schools with SBAE programs. To examine school level retention of SBAE teachers, we applied a similar lens to that previously used to examine mobility (Haddad et al., 2021). Noting a focus on location, without presuming to identify individual factors, we applied Vagi & Pivovarova's (2016) call to apply person-environment theory to approach mobility (person-environment accommodation model (Holland, 1997, p. 68)).

Literature Review

The broader educational conversation around teacher mobility is squarely situated within teacher retention and attrition. By conventional terminology, our study focuses on two sides of the same conversation: *lateral mobility* for teachers (retention into similar positions within the teaching profession) and *attrition* (loss of teachers) for schools (WWC, 2014). The most current literature related to teacher mobility and attrition spans the career with foci across teacher preparation (Goldhaber et al., 2020), administrative climate (Perrone et al., 2019), professional characteristics (Day, 2021; Garcia et al., 2022; Gibbons, et al., 2021; McKibben et al., 2022; Moser & McKim, 2020; Pivovarova & Powers, 2022), teacher evaluation (James & Wyckoff, 2020), and professional development (Berezhna, 2020). Despite Vagi and Pivovarova's (2016)

call, the literature continues to focus narrowly on characteristics of teachers and schools. We'll use our literature review to outline those characteristics across the career span, recognizing they have important implications for how we were able to consider our data.

Limited existing research considers preservice implications for the path of a career. Goldhaber et al. (2020), however, noted interesting correlations between teacher preparation and retentive outcomes. Specifically, candidates in hard to staff subjects (e.g., STEM related areas) were significantly more likely to enter the teaching profession upon graduation and teachers who student taught in schools more like their student teaching placement were more likely to be retained (Goldhaber et al., 2020). Our dataset and others in SBAE have yet to explore this area of teacher attrition.

Of course, teacher burnout is a stalwart of the turnover and attrition conversation. Administrative climate, including policies, practices, and beliefs affect both teachers' work and their relationship quality with administration. Administrative climate largely manifests as the lack of time or resources to manage an excessive workload (Perrone et al., 2019). While not specifically discussed in SBAE, the parallels are clear, and systemic and organizational warnings point to a need to further explore patterns of teacher mobility and school level attrition (Haddad et al., 2022).

Substantial attention remains with professional characteristics. Garcia et al. (2022) and Pivovarova and Powers (2022) summarized the state of the teacher workforce. Garcia et al. (2022) noted the importance of teacher voice, supportive work environments, fewer school problems, and greater teacher morale as significantly reducing attrition. On the other hand, teachers with less autonomy, alternatively certified teachers, teachers in charter schools, and teachers with higher educational attainment have higher attrition rates (Garcia et al., 2022). Pivovarova and Powers (2022) corroborated higher attrition rates in rural charter schools, novice teacher populations, and charter schools with high free and reduced lunch (FRL) populations.

Day (2021), on the other hand, emphasized the importance of commitment to a career in teaching. Commitment includes passion, investment of additional time, student well-being and achievement, responsibility to maintaining professional knowledge, transmission of knowledge and values, and engagement in the school community (Day, 2021). McKibben et al. (2022) counteract the discussion of commitment with their own approach to job satisfaction. Time spent on personal recreation, salary, and working on SAEs significantly predicted job satisfaction (McKibben et al., 2022). Notably, McKibben et al. (2022) found SBAE teachers did not work themselves into more free time; years teaching and amount of time spent in recreation were not significantly correlated. In other words, McKibben et al. (2022) found the idea of putting in additional hours now to have more time for the things you want to do later to be a myth.

Moser and McKim (2020) explored teacher retention from a relational perspective. They recognized the link between career commitment and teacher connectivity and found their sample of SBAE teachers to have greater connectivity with the profession and lower connectivity to their school (Moser & McKim, 2020). Notably, SBAE teachers' greater connectivity to their profession (e.g., curriculum and other teachers) is also the area where teachers work with the most autonomy (Haddad et al., 2021). We anticipated similar patterns of professional and school connectivity with our state's sample. However, this was an assumption of our study rather than

an idea our data allowed us to confirm or question. We assumed professional commitment among our mobile teachers; they were willing to remain in the profession, but not at their school.

Still others questioned teachers' career patterns based on their effectiveness. In addition to finding low impact on attrition from teacher evaluation, James and Wyckoff (2020) considered differential effects on student outcomes based on high and low performing teacher exits. Specifically, replacement efforts were not as straightforward as the base number of teachers in the school or profession. Teacher replacement tended not to occur as a net neutral event; in other words, experience was rarely replaced equally. This had both benefits and challenges at the local level. James and Wyckoff (2020) saw benefits to students when less effective educators were replaced by more effective teachers. The inverse was also true, however, as highly effective educators were more likely to be replaced by less effective peers (James & Wyckoff, 2020). This school level assertion supported Berezhna's (2020) recognition of mobility as a necessary quality for a modern teacher that can improve the quality of educational activities in educational institutions.

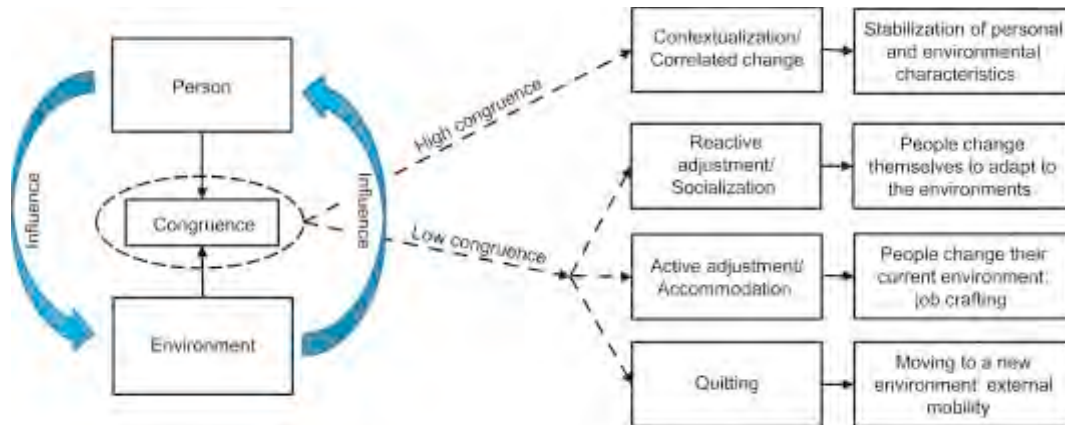
Theoretical Framework

In light of the characteristics considered above, and the call to consider attrition and retention beyond characteristics of schools and teachers (Vagi & Pivovarova, 2016), we found ourselves considering the nuance of teacher mobility as potentially productive for the individual teacher and challenging for schools and districts. With 30% of SBAE program openings filled by mobile teachers annually (Foster et al., 2020; Foster et al., 2016; Foster et al., 2015; Smith et al., 2019; Smith et al., 2018; Smith et al., 2017) and 60% of first-time movers making subsequent program moves (Haddad et al., 2021), additional work was needed to better understand mobility on the state level. Furthermore, recent teacher mobility literature noted heightened challenges facing both individual schools and the broader education profession regarding early-career teacher retention (Perrone et al., 2019).

Vagi and Pivovarova (2016) acknowledged similar effects teacher mobility and attrition had on schools while noting differences driving teacher choice and intention. In other words, for mobile teachers, it may not have been mismatch of profession, but a mismatch of location (Vagi & Pivovarova, 2016). While identifying several factors and potential theories in the teacher mobility framework, Vagi and Pivovarova (2016) argued no one theory encompassed the breadth of factors influencing a teacher's decision to change schools. This acknowledged the teaching career as a series of complex decisions, requiring an expansive theory to encompass the multitude of factors. They suggested person-environment theory provides the best lens for examining teacher mobility (Vagi & Pivovarova, 2016). Notably, its close counterpart, the person-environment accommodation model includes several factors of *congruence* aligning with time between program moves (Figure 1., Holland, 1997, p. 68).

Figure 1.

Theory of Vocational Choice, Person-Environment Accommodation Model (Holland, 1997)



The problem, as it currently stands, finds SBAE ill-equipped--at the professional level--to support mobile teachers. We understand relatively little about teachers' decision-making processes, and even less about patterns of attrition across our states or in SBAE more broadly. Provisions of support cannot be well supplied if mobile teachers remain unreported, and subsequently unexplored. Given the only study within the Journal of Agricultural Education (JAE) quantifying mobile teachers focuses on a single state (Haddad et al., 2020), it was time to add ours to the available research to better ascertain patterns of mobility for teachers and schools.

Purpose & Research Question

The purpose of our study was to quantitatively describe teacher mobility in Minnesota over the last 25 years (1995-2020). We guided our research using the following questions:

1. What is the 25-year SBAE mobility rate for Minnesota? At how many years' experience in Minnesota do SBAE teachers tend to change schools?
2. How often do SBAE programs in Minnesota tend to experience teacher turnover / a change of teachers? Are they replaced with equally experienced teachers?

Our study aligns with AAAE Research Agenda Item 3, Priority Question 2 (Stripling & Ricketts, 2016): What methods, models, and practices are effective in recruiting agricultural education practitioners and supporting their success at all stages of their career?

Methods

Teacher Mobility Sample

To describe program retention in our state, we utilized teacher retention data compiled from state teacher directories over the last 25 years (1995-2020). The initial data set included 1012 teaching positions over 25 years ($N = 1012$). Our data showed teaching positions by school, teacher name, and teacher career timeline demographics (first year teaching, first year in district, and last year in district). This position population included 696 teachers over 25 years. Using this information, we calculated years' experience at hire, time in position, years' experience in profession, mobility, and career choice. Across our state's SBAE teaching population, teachers had a mean seven years' teaching experience (median = 2, mode = 1) in 1.3 schools.

Our full dataset included 186 (n_1) mobile teachers (teachers who changed schools at least once between 1995-2020). We identified initial and subsequent moves for each teacher in the dataset and retained teachers who had changed programs at least once. We calculated the mean, median, and mode years teaching for the sample of mobile teachers ($n = 186$), as well as composite mobility levels by NCES experience breakdowns. While for our purposes, we only compared our state to previous studies in mobility and national data in agricultural education, we used the NCES experience breakdown to provide consistency with an accepted delineation of experience. We also identified *move intervals* (time in program between moves). Teachers ranged from 0-26 years of experience in any given position and one to five program moves. These teachers, collectively, held 432 positions; 186 were initial hiring districts and 246 were subsequent moves. Of these mobile teachers, 111 were still teaching in 2021, while 75 (40%) were no longer in the SBAE classroom.

Only teachers who made consecutive program moves, regardless of interval, were counted in the mobile sample. Teachers who left teaching for a time and returned were not counted in the mobile sample. Entry year did not count as a mobility year, though it could be argued the teacher was “moving” from training to workforce. Our distinction, however, is supported by substantial literature characterizing the induction year of teaching as year one. Our dataset is also limited in identifying teaching experience in other states prior to Minnesota.

School Retention Sample

We used the same initial dataset to describe SBAE program turnover in Minnesota. The initial data set of 1012 teaching positions ($N = 1012$) showed teaching positions by categorical variables including district name, school code, FFA region, and teacher code, and numeric variables including year started, year left, years retained, years of experience at start and end in each school, and total years of experience as of 2021. Eighteen (18) positions presented with name data only and were removed from the frame ($N_2 = 994$).

There were 250 schools comprising 994 SBAE positions (N_2) as reported from 1999-2020. Position level data varied in completeness; most commonly missing position start years. This made it difficult to calculate years retained, starting experience, and total experience for the full dataset. We analyzed and reported findings based on the available data for 771 positions as complete school data points (n_2). Using the available data, we calculated mean, median, and mode for school level retention, as well as retention by experience and composite retention by NCES experience breakdown. Given the historical nature of the data set, we noted steady school-level attrition over the 25-year period. A total of 3.3% of school districts lost teachers annually. This is lower than the national SBAE average for attrition (4.5%) (Smith et al., 2021). No school made up more than 1.2% of the final sample (approximately twelve SBAE positions over the 25-year frame). Remember, positions do not necessarily equate to number of teachers. Positions could be as indicative of program growth as of turnover.

Limitations

We do not purport to make comparative claims. While highlighting a historical representation of Minnesota, this should not be presumed representative of the national SBAE population. Ideally, our research will spur further examination of program and teacher

demographics in other states, as we further examine these areas within our own state’s SBAE teaching population. Data limitations also prevented the assembly of a fully historical picture. With only a 25-year frame, we did not capture the full potential of a career, and our data skew toward a less experienced workforce. Available data began in 1995, examined here as a starting point, to understand Minnesota’s teaching population. They do, however, support understanding career trajectories for early experience teachers. These data are descriptive. We are not attempting to corroborate or dismantle themes in the literature related to school level SBAE retention. However, recognizing to what degree Minnesota SBAE teachers were retained to programs will allow for greater understanding of broader implications for local programming and teacher careers. Identifying programs with retention challenges will also allow us to target solutions and provide support.

Findings

Research Question 1: What is the 25-year SBAE mobility rate for Minnesota? At how many years’ experience in Minnesota do SBAE teachers tend to change schools?

Simply put, 186 (27%) of the 696 teachers in this sample changed schools at least once in the 25-year sample window. This historic mobility rate corroborates the California study of SBAE teacher mobility (Haddad et al., 2021) and mirrors national data for teacher mobility for the last several years (Foster et al., 2020; Foster et al., 2016; Foster et al., 2015; Smith et al., 2019; Smith et al., 2018; Smith et al., 2017).

We identified mobile teachers as those who taught in two or more schools during their tenure in SBAE ($n_1 = 186, 27\%$). These 186 teachers engaged in 246 program moves (approximately 1.3 moves per teacher). Bear in mind, teachers who moved at least once were denoted as *mobile teachers*. Subsequent moves were not additive in identifying the mobile subset of teachers. First time moves (second schools) accounted for 76% of the sample mobility, while only 25% were subsequent moves (two or more). On average, mobile teachers started at a new school with an average of four years of experience (range = 1-17 years), and were retained for five years, on average (range = 0-21 years).

Table 1.

Mobility frequencies by move for Minnesota SBAE teachers (1995-2020)

	Move 1	Move 2	Move 3	Move 4+
Mobility Frequency ¹	186	42	13	4
% Total ($n = 696$)	27%	6%	2%	<1%
% Mobile ($n_1 = 186$)		23%	7%	2%
Attrition Frequency ²	62	11	1	1
% Mobile Attrition ($n_3 = 75$)	82%	15%	<.01%	<.01%

Note: ¹ Mobility frequency (n_1), denotes all teachers who taught in more than one school

² Attrition frequency denotes the attrition frequency among mobile teachers ($n = 186$)

In the total sample (696 teachers), 186 (27%) teachers moved at least once, 42 (6%) moved twice, 13 (2%) moved three times, and five (<.01%) moved four or more times. No teacher made more than five program moves in the 25-year sample frame. Within the mobile group of teachers ($n = 186$) there were 60 subsequent moves across 42 teachers (23% subsequent mobility rate). This is a much lower subsequent turnover rate than noted in previous studies (60%, Haddad et al., 2021). Notably, all but one of the teachers who moved three and four times were still teaching as of 2021. Even then, this one teacher was still involved in the larger education profession at the time of the study (post-secondary education).

A total of 75 (40%) of mobile teachers were no longer teaching as of 2021. Their attrition is not necessarily a direct result of mobility, noting some teachers taught upwards of twenty years in subsequent programs. On average, after a move, teachers were retained 4.8 years prior to leaving teaching (median = 3, mode = 1). The mode, is perhaps more telling than the mean in this instance, noting the most frequently leaving teaching after a move did so after their first year in a new district (19, 25%). In our mobile sample, 111 (60%) were still teaching in 2021.

In all, 47 (25%) mobile teachers made their first career move immediately after their first year of teaching. Most teachers (68%) moved again within five years of starting at a new district, and within the first ten years of their teaching career (66%). Table 2 shows mobility by experience for the first five years in a new district. Table 3 shows mobility by years of experience by the National Center of Education Statistics (NCES) breakdown for total years of experience.

Table 2.

Mobility by experience for Minnesota SBAE teachers (1995-2020, $n = 186$)

	Experience at Hire	Retained to District	Career Experience
Year 1	47 (25%)	70 (38%)	**
Year 2	26 (14%)	36 (19%)	14 (7%)
Year 3	23 (12%)	21 (11%)	16 (9%)
Year 4	12 (6%)	16 (9%)	15 (8%)
Year 5	17 (9%)	18 (10%)	15 (8%)

Note: The mobility sample included those in their second program and beyond. No teachers in the mobile sample had only one year of experience upon starting at their second school. We had the most missing data in the start year category; all percentages above are conservative based on our total sample of mobile teachers, considering missing data (*missing = 74*)

Table 3.

Mobility in Minnesota SBAE teachers (NCES career experience, 1995-2020, $n = 18$)

	Move 1	Move 2	Move 3	Move 4
1-3 years in program	34 (18%)	1 (< 1%)	1 (< 1%)	0 (< 1%)

4-9 years in program	53 (28%)	19 (10%)	2 (1%)	0 (< 1%)
10-19 years in program	38 (20%)	13 (7%)	7 (4%)	4 (2%)

Note: missing = 74

Table 4 shows experience at hire for mobile teachers in Minnesota by NCES experience groupings. Notably, almost half (46%) of mobility hires have three or fewer years of career (total) teaching experience when they make their first transition to a different SBAE program in a new school district. This corroborates trends in the broader educational research (Feng & Sass, 2012; Haddad et al., 2021; Ingersoll & Smith, 2003) noting vacated positions are most often filled by less experienced educators.

Table 4.

Mobility in Minnesota SBAE teachers (NCES career experience at hire, 1995-2020, n = 186)

	Move 1	Move 2	Move 3	Move 4+
Year 1-3	86 (46%)	10 (5%)	0	0
Year 4-9	29 (16%)	13 (7%)	8 (4%)	1 (< 1%)
Year 10-19	10 (5%)	9 (5%)	1 (< 1%)	3 (2%)

Note: Given the relative experience of the sample, few teachers had more than 20 years of experience, and none have experienced program moves beyond 19 years. Sixteen datapoints did not include enough information to identify teacher years of experience. (*missing = 74*)

In addition, teachers were retained 4.8 years in a new program. Teachers changing schools started in new schools with 4.3 years' total teaching experience (on average). The mobile sample of teachers ($n_I = 186$) averaged 8.6 years of career teaching experience at the time of the study. Table 5 outlines moves by years in program.

Table 5.

Mobility in Minnesota SBAE teachers (time in program, 1995-2020, n = 186)

	Move 1	Move 2	Move 3	Move 4+
1-3 years in program	89 (48%)	26 (14%)	9 (5%)	3 (2%)
4-9 years in program	65 (35%)	13 (7%)	2 (1%)	2 (1%)
10-19 years in program	26 (14%)	2 (1%)	1	0

Note: missing = 74

Remember, 186 (n_I) of the total 696 (n) teachers in our dataset were considered mobile (i.e., changed schools at least once). Of these mobile teachers, 48% made their first move between their first- and third year in a program, a lower percentage than found by Haddad et al.,

2021. This finding bears implications for our professional induction of early-career teachers, especially considering the narrative around mobility being a career restart.

Research Question 2: How often do SBAE programs in Minnesota tend to experience teacher turnover / a change of teachers? Are they replaced with equally experienced teachers?

Across this dataset, positions in Minnesota schools ($n_2 = 771$) retained SBAE teachers for an average of seven years (median, 2 years). Since our school sample included teachers who had not moved, our average school retention is higher for the total sample, compared to the mobile sample. Most districts hired a teacher with no prior teaching experience in Minnesota (410, 60%). Less than 10% of districts hired a teacher with more than five years of experience while 20% of districts hired teachers with 1-4 years of experience. Overall, districts hired teachers, on average, with 1.5 years’ experience.

While mobile SBAE teachers in Minnesota had, on average, 8.6 years’ career experience; non-mobile teachers averaged 5.7 years career experience. This difference is not causal; mobile teachers are not necessarily more experienced than their non-mobile counterparts, particularly since the school sample includes much higher instance of attrition. The full sample also included induction year teachers who did not have opportunities for mobility. Notably, 72% of the positions over 25 years were occupied by teachers with five or fewer years of experience. Given our focus on schools, 11 schools had ten or more teachers over the 25-year frame. While many of these schools were multi-teacher programs with three or more teachers; some were not. In addition, 27 schools (including the previous 11) had eight or more teachers over 25 years. In single teacher programs, this averaged a new teacher every three years. Additional attention in future research may look at how to best support schools hiring a new SBAE teacher at that frequency.

Complete data for 771 positions (n_2) allowed us to examine school-level turnover. Over the 25-year frame, 34% (260) of SBAE positions retained a teacher for only one year. Fifty percent (380) of positions retained teachers for two years or fewer. A total of 459 positions (60%) maintained a teacher for three years or fewer. Table 6 outlines the retention rates for SBAE in Minnesota by years of experience.

Table 6.

Years’ retention in Minnesota SBAE programs (1995-2021) ($n_2 = 767$)

NCES Grouping	Frequency	Percent
1-3 years	463	60.1%
4-9 years	208	27.0%
10-19 years	82	10.6%
20+ years	14	2.3%

Note: we were missing data for four schools to determine retention by NCES grouping. Years, in this case, focused on experience in school rather than total teaching experience.

Only 14 SBAE programs in 25 years retained a teacher for twenty or more years; what most would consider an entire *career*. However, years retained only tells part of the story as districts must hire a teacher to replace the one who left. Of the 771 (n_2) positions with complete data, 482 (62.2%) were first time hires in Minnesota. This did not necessarily mean they were first-year or first-career teachers, but by-and-large, they were. Most districts hired a teacher with no prior teaching experience (410, 60%). Less than 10% of districts hired a teacher with more than five years of experience while 20% of districts hired teachers with 1-4 years of experience.

Only 3% of schools hired teachers beyond two moves. These data do not clearly tell us if schools were wary of hiring teachers who moved multiple times or if teachers left the profession after moving. However, previous studies (Haddad et al., 2019; Haddad et al., 2021) indicate both. These additional data help us understand how to better support SBAE programs in onboarding new teachers and mobile teachers.

Recommendations & Conclusions

These findings add to a growing base of research surrounding the support of mobile SBAE teachers. While we only provided a quantitative description of mobility in our state, it clarifies the picture regarding *churn*, mobility rates, and the teaching experience of mobile teachers. These findings bear implications for our pre-service preparation, induction level support, and mid-career advice and support relative to the suggested reduction of frequency in mobility with additional teaching experience. Certainly, SBAE teachers move, but individual teachers do not appear to be stuck in cycles of mobility.

A previous study showed 30% of SBAE teachers left teaching altogether after a program move (Haddad et al., 2021). Our sample presented a much higher frequency (62, 82%). We note this may be a result of a smaller sample size and incomplete data. It does, however, corroborate Haddad et al.'s 2021 study in recognizing mobile teachers were most likely to exit the profession after their first move (compared to subsequent ones). This should warrant heightened attention for state level teacher support programs; the first year in a new school brings heightened challenge, even for the experience teacher (Haddad et al., 2019).

We also saw mobility rates continued to decline as teaching experience accrued. While this meant several were retained to the profession through mobility, ideas of *congruence* (Holland, 1997) bear implications relative to this study for pre-service preparation, induction level support, and mid-career advice and support. In prior studies, mobile teachers have urged their peers considering a move to evaluate the desired change and if a geographical shift would affect that change (Haddad et al., 2019). For pre-service programs, raising awareness for the influence of a person on their environment and environment on a person could prove essential.

These habits of self-evaluation subsequently follow into induction where *high congruence factors* (Holland, 1997) such as contextualization and stabilization aid a person in seeing greater influence over their environment or vice versa. We see this as particularly relevant to the turnover following the first year after a move to a new program. Understanding induction as a process extending beyond the first year in the classroom should prompt teacher support

programs to incorporate mobility as an essential component of the career. Providing mentoring support to evaluate career decisions may become an essential goal of induction programs, recognizing a currently ill-defined *second induction* upon changing schools.

While *congruence factors* help us conceptualize the necessary components for consideration between person and environment that allow us to explore mobility, we are left with questions this framework may not be well suited to answer. Only 14 (2.3%) SBAE positions over the 25 years retained a teacher for what most would consider their *career*. While retaining teachers beyond 20-years may feel ideal, this does not align with the reality presented here or in previous studies (Haddad et al., 2019; Haddad et al., 2021). This begs the question: what is a reasonable amount of time to retain a SBAE teacher? At what point should teachers change positions to better their career? How can schools better support and respond to mobility, particularly among first time movers? How does the three-year school-level retention rate reflected in this study affect students' SBAE experience? What incentives and policies at the district, state, and federal level would need to be in place to make teaching careers more attractive and feasible, especially when attempting to mitigate the loss of an experienced teacher? SBAE teachers have expressed pay increases as secondary considerations in their decision-making process (Haddad et al., 2019), but they do not seem to be deterred from moving by a pay decrease or strongly incentivized by a pay increase either.

Given mobile teachers most frequently left their teaching positions after one year in a new program begs us to revisit the anecdotal *restart* of a move in future research. This may shift our view of what it means to support mid-career teachers, particularly as they experience *reinductions* through program moves. Since we did not examine perceptions of congruence specifically, additional research is necessary to examine congruence as teachers progress through a career. We can certainly point back to Vagi and Pivovarova's (2016) reminder that the driving mechanisms and subsequent supports look different for mobility compared to attrition. However, we cannot assume a career point at which *stabilization* has been reached, requiring no further support. Regardless of how many years of experience a teacher has, he or she will likely still cycle through needs for learning/growth and stability/performance.

The questions driving this examination considered whether Minnesota's SBAE retention mirrored national retention challenges faced by schools, whether experience is equally replaced, and Minnesota's school level retention rate. We found 27 schools having employed eight or more teachers over the last 25 years. While this only accounts for 11% of the 249 programs in Minnesota, next steps may look to specifically support these programs in maintaining qualified teachers. While Minnesota has a teacher induction program to support first year teachers and state staff well equipped to support districts in the *logistics* of onboarding (e.g., Perkins funding, program approval, FFA rosters), little provides direct support to districts by way of understanding onboarding, supporting, and retaining SBAE teachers. Given recent attention to teacher satisfaction, identity, and motivation (Clemons & Lindner, 2019; Hasselquist et al., 2017; Solomonson & Retallick, 2018; Solomonson, Thieman et al., 2019; Solomonson, Still et al., 2021) in the current literature, this may be warranted. In returning to the framing of this study, additional attention to congruence factors (Holland, 1997), may be a helpful starting point in supporting districts in influencing retention in their SBAE programs.

This study provides a steppingstone from which to continue exploring school-level retention challenges. In our state and others, the system of SBAE is comprised of several levels of support. Across the career, these include preservice educators, state staff, local administration, community alumni chapters and advisory boards, and educational policy makers. Each have a role to play in understanding and incentivizing factors of congruence (Holland, 1997) to help teachers find environmental fit. Additionally, turnover in the broader workforce reminds of the need to attract the teacher first, regardless of how teachers reflect on incentives influencing their choice to change schools. Further conversation with state licensing boards, school districts, and educational policy makers is necessary to consider how experience is valued when moving into teaching from industry or moving to another district. Are there behaviors, characteristics, and values the teaching profession demands that no longer align with today's teacher? While our data do not support answering these questions, they remain, nonetheless. Regardless of the ideal retention span, we must adopt heightened attention to the dynamic interplay between person and environment.

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Exploring the Relationship Between Systems Thinking Tendencies and Green Consumer Values to Inform Innovative Educational Connections

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Abstract

University agricultural educators are challenged to employ innovative approaches to prepare undergraduates in agriculture and natural resources to address complex global problems while understanding interconnected systems. Undergraduates, current members of Generation Z (Gen Z), prefer environmental sustainability and innovation, but solutions for addressing these preferences in educational settings remain elusive. Exploring Gen Z's environmental consumption values and how those values relate to their systems thinking tendencies may provide university educators with insights on how to best educate Gen Z students. The purpose of this study was to examine the association between Gen Z students' green consumer values and systems thinking tendencies. Data were collected using a web-based survey instrument of 68 undergraduate students at the University of Georgia. Findings revealed respondents somewhat agreed they had green consumer values and respondents often used systems thinking when seeking to make an improvement. A Spearman's rank-order correlation coefficient indicated a positive, yet weak, association between systems thinking tendencies and green consumer values. The association necessitates further exploration. University agricultural educators should incorporate systems thinking educational tools into classrooms so Gen Z students can effectively engage in systems thinking when addressing complex agricultural issues, like sustainability. Additional implications for systems thinking teaching are explored.

Introduction

The 2021 inaugural United Nations (UN) Food Systems Summit emphasized a difficult truth – the world's food systems are broken. Hosted in an effort to address the grand challenges

associated with the world's current food systems, the summit called for action by "external and internal drivers, as well as through feedback mechanisms between these drivers" (von Braun et al., 2021, p. 748). As countries work cohesively to address food systems issues and reach the UN Sustainable Development Goals (SDGs), they seek to move toward sustainable food systems (*Future food systems: For people, our planet, and prosperity*, 2020). Within sustainable food systems, food production occurs with the intent to limit harm to the long-term functionality of the natural environment by reducing "biodiversity loss, pollution, soil degradation, or climate change" (*Future Food Systems: For People, Our Planet, and Prosperity*, 2020, p. 15). The current generation of students pursuing higher education degrees in agriculture and natural resources are a crucial part of creating innovative, transdisciplinary approaches to address emerging ecosystem issues in changing global societies (Chang et al., 2020). Colleges of agriculture and natural resources must use innovative educational methods to produce graduates who understand the differences between and connections among complex global systems (Foster et al., 2014; Hunter et al., 2006).

Today's university undergraduate students are primarily classified in the United States (U.S.) within the generational cohort known as Generation Z (Gen Z); individuals born between 1995 and 2012 (Maloni et al., 2019). From an educational perspective, studies have found that Gen Z students are skilled at multitasking and value creativity (Schwieger & Ladwig, 2018). However, Gen Z students may not feel prepared for the challenges of the real world and often have short attention spans (Schwieger & Ladwig, 2018). Thus, teaching Gen Z students is unlike educating any other generation, especially considering their preferences for innovative technology and instant access to information (Cilliers, 2017; Nicholas, 2020). Educators must adapt their teaching styles according to the learning preferences of Gen Z students and sufficiently provide them with information needed to navigate a quickly evolving workforce (Schwieger & Ladwig, 2018).

The consumption values of Gen Z have been studied from a generational marketing perspective to understand generational food consumption as related to common values (Garai-Fodor, 2019) and typical behaviors (Kamenidou et al., 2019) but pose a particular challenge for marketers because of their focus on constant innovation (Priporas et al., 2017). Still somewhat elusive from both an educational standpoint and a consumer standpoint, further exploration of Gen Z is necessary to understand how instructors can best cater to the Gen Z cohort when educating and preparing them for future careers in agriculture and natural resources. Exploration of how to best educate Gen Z may be instrumental in addressing the world's wicked problems from a holistic perspective considering both social and ecological factors (Pauley et al., 2019).

One defining characteristic of Gen Z is the generational cohort's emergence as the "sustainability generation" (Petro, 2022). According to the 2021 global survey of Millennials and Gen Z, compared to preceding generations, Gen Z is more concerned about climate change and protecting the environment than almost any other issue and values the environmental impact and sustainability of their purchasing habits (Deloitte, 2021). Gen Z is more likely to engage in sustainable consumption due to environmental concern, also identified in the literature as green, environmentally friendly, ethical, and ecologically friendly consumption (Halder et al., 2020). The agricultural and natural resources industries have been called upon to foster sustainable practices within the formative years of Gen Z's upbringing, necessitating adaptability within the

industries (Pauley et al., 2019). Therefore, exploring the environmentally friendly, or green, consumption values unique to Gen Z may give university agricultural educators insight into how to connect with students about broad-reaching, systemic problems related to environmentally conscious, sustainable production and consumption patterns within the food system.

Green consumption has been associated with responsible handling of personal financial and physical resources (Haws et al., 2014), while cultural and geographic differences between students in different countries have been shown to play a role in students' pro-environmental behavior (Vicente-Molina et al., 2013). However, the relationships between socio-demographic characteristics and environmentally conscious behaviors are extremely complex, making it difficult to profile consumers by their environmental consciousness and associated behaviors (Diamantopoulos et al., 2003). Understanding more about students' decision-making patterns and values associated with green consumption may help agricultural educators understand more about the values students hold and the influence they may have on students' consideration of complex systems-based problems.

The current study sought to investigate the association between Gen Z undergraduate students' systems thinking tendencies and their green consumption values in order to explore connections agricultural educators can make between environmentally-friendly consumption and systems thinking. These connections may be used to employ innovative educational approaches in preparing students for a globalized workforce seeking to solve wicked problems (Foster et al., 2014; Hunter et al., 2006). Therefore, the current study addresses a research priority of the national research agenda for the American Association for Agricultural Education (AAAE): Priority 3 – Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century (Stripling & Ricketts, 2016).

Conceptual Framework

The conceptual framework guiding the current study was the integration of systems thinking and green consumerism.

Systems Thinking

Systems thinking is an educational perspective that has been proposed as a solution to guide students in comprehending and taking actions to solve issues with intricate and interconnected elements, such as the complex challenges facing the food system (Monroe et al., 2015; Reynolds et al., 2018). Systems thinking may help students understand and explain the dynamics of complex systems that have evolved over time (Sweeney & Sterman, 2000). However, systems thinking capacities are one of the most challenging skills for students to acquire (Molderez & Ceulemans, 2018), and agriculture and natural resource educators are challenged to utilize a systems thinking framework to encourage students to solve global grand challenges (Pauley et al., 2019).

Systems thinking is frequently studied in the health field because it considers the constantly changing context, actors, and interactions within a system (Rusoja et al., 2018). Recently, systems thinking has received attention as an approach for STEM education (e.g., York et al.,

2019) and, more specifically, sustainability education (e.g., Molderez & Ceulemans, 2018). For example, systems thinking has been used as a mechanism in education to emphasize the importance of understanding the environmental chemistry consequences behind individual consumer choices and how certain products affect other systems in a society (Murphy et al., 2019). In the classroom, instructors who have utilized systems thinking approaches have reported active participation among students, deeper understanding of content, students asking better questions, and students making connections between and within concepts (York et al., 2019). According to Molderez and Ceulemans (2018), “the competencies for systemic thinking and handling complexity were fundamental for students to be able to understand contemporary societal challenges and to shape a more sustainable world” (p. 758). Systems thinking is therefore well suited for the ambiguous context of sustainability (Molderez & Ceulemans, 2018), yet it has not been widely integrated into STEM education (York et al., 2019). While systems thinking is currently being employed in a STEM education context, there is limited literature surrounding systems thinking as an approach in agricultural and natural resource education.

Green Consumerism

Promotion of green products is widespread and the idea of purchasing green products is supported by many consumers (Schuitema & de Groot, 2014). Haws et al. (2014) defines green consumption values as “the tendency to express the value of environmental protection through one’s purchases and consumption behaviors” (p. 337). However, the idea of purchasing green products is not always translated to actual purchasing behavior, indicating green consumerism may be influenced by a variety of unknown factors, meriting further research (Schuitema & de Groot, 2014). Environmental education programs have been found to increase consumers’ green purchasing behavior. For example, Pearcy (2009) found a significant positive relationship between college student involvement in informal environmental education programs and their green consumption behavior.

Not all consumers will purchase green products regardless of their environmental benefits (Haws et al., 2014), but Gen Z students may have higher green consumption values than prior generations considering their stance on environmental issues (Deloitte, 2021). Green consumption values influence green consumer behavior in that consumers tend to purchase more green products when they are aware their purchase patterns will not harm the environment (Alagarsamy et al., 2021). While individuals with greater green consumption values hold stronger preferences for sustainable consumption, the impact of cultural values and ethical ideologies on green consumption values adds to the complexity of translating green values to green consumer behavior (Halder et al., 2020).

Although Gen Z students value the environmental impact and sustainability of their purchasing habits (Deloitte, 2021), barriers such as product cost may limit actual purchasing behavior (Schuitema & de Groot, 2014). Additional relevant barriers that may hinder Gen Z consumers from transferring green consumption values into purchasing behavior include perceptions of quality, brand loyalty, and convenience of acquiring green products (Moser, 2015). It is possible systems thinking tendencies play a role in green consumption considering the complexities associated with green consumerism. Therefore, this study aims to add to the existing literature by

examining green consumer values in relation to systems thinking within agriculture and natural resources classrooms.

Purpose and Research Objectives

The purpose of this study is to describe the association between students' green consumer values and their systems thinking tendencies using the following objectives:

1. Describe students' green consumer values and systems thinking tendencies.
2. Determine if an association exists between students' green consumer values and their systems thinking tendencies.

Methods

This quantitative study was part of a larger research project designed to explore undergraduate students' systems thinking tendencies related to sustainable seafood consumption through an online survey and focus groups (Sanders et al., 2022). As such, some methods remain the same from the work of Sanders et al. (2022). Data were collected from University of Georgia undergraduate students enrolled in classes within the College of Agricultural and Environmental Sciences. Two parts of the online survey instrument were used for the current study: a systems thinking scale and green consumer values scale. The study was approved by the University of Georgia Institutional Review Board (Protocol #00004479).

Instrumentation

A web-based survey instrument was created using the Qualtrics online survey platform and included demographic and Likert-type questions. Students' green consumption values were measured using the GREEN scale, which is a six-item scale measuring green consumer values rather than behavior (Haws et al., 2014). The seven-point Likert-type scale asked respondents to indicate their level of agreement or disagreement with a set of six questions related to their green consumption values (1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Somewhat disagree*; 4 = *Neither agree nor disagree*; 5 = *Somewhat agree*; 6 = *Agree*; 7 = *Strongly agree*). Scale reliability was calculated post hoc ($\alpha = 0.87$). Responses were averaged to form a single green consumption values score between one and seven.

Systems thinking tendencies were measured using a 20-item researcher-adapted systems thinking scale (Dolansky et al., 2020). Respondents were asked to indicate their personal process for making improvements using a five-point Likert Scale (0 = *Never*; 1 = *Seldom*; 2 = *Some of the time*; 3 = *Often*; 4 = *Most of the time*). For example, "When I want to make an improvement...I look beyond a specific event to determine the cause of the problem" (Dolansky et al., 2020, p. 2318) or "When I want to make an improvement...I keep in mind that proposed changes can affect the whole system" (Dolansky et al., 2020, p. 2318). Scale reliability was calculated post hoc ($\alpha = 0.89$). Responses were summed to provide an overall systems thinking score ranging from zero to 80 (Dolansky et al., 2020).

To ensure content validity, a team of experts in survey design, agricultural and environmental communication, and program evaluation reviewed the instrument. The instrument was pilot

tested with seven individuals who were Gen Z students to further confirm face validity. No modifications were made to the scales based on responses to the pilot study.

Data Collection and Analysis

Respondents who participated in the study were undergraduates at the University of Georgia in courses within the College of Agricultural and Environmental Sciences. Students were invited to participate in the study because of their enrollment in these classes but were informed that choosing not to participate in the study would not affect their course standing or grade. Students who consented to participation answered hypothetical case scenarios (HCS) or “choose your own adventure” scenarios related to systems thinking archetypes outlined by Rutherford (2019) before completing the survey. It is possible the manner in which the HCS were presented may have affected student responses to the present constructs within the survey and is recognized as a limitation. However, no educational interventions about systems thinking or green consumer values were performed in advance of the survey questions limiting exposure. Data collection began November 10, 2021 and concluded April 20, 2022 based upon scheduling availability in undergraduate courses.

Responses from 68 students were obtained across five classes. Responses were eliminated from any students who fell outside the Gen Z demographic age maximum of 26 at the time of the survey. Detailed demographics of respondents can be found in Table 1.

Table 1
Demographics of Respondents (N = 68)

	<i>F</i>	<i>%</i>
Gender Identity		
Male	20	29.4
Female	47	69.1
Age		
18	3	4.4
19	15	22.1
20	14	20.6
21	16	23.5
22	13	19.1
23	6	8.8
24	1	1.5
Race/Ethnicity ^a		
White	55	80.9
Black or African American	8	11.8
Asian	2	2.9
Hispanic or Latino/a/x	4	5.9
Prefer to self-describe (Middle Eastern)	1	1.5
Student Classification		
First-year student	4	5.9
Sophomore	12	17.6
Junior	25	36.8

Senior	24	35.3
Graduate student	1	1.5
Other (Exchange Student)	1	1.5
College Enrollment		
College of Agricultural and Environmental Sciences	44	64.7
College of Arts and Sciences	9	13.2
College of Business	6	8.8
School of Public and International Affairs	2	2.9
College of Engineering	1	1.5
College of Journalism and Mass Communication	1	1.5
College of Education	1	1.5
Undeclared	1	1.5

Note. ^aRespondents were permitted to select more than one race or ethnicity.

Data were analyzed using SPSS 26. The Spearman rank-order correlation coefficient was used to determine the nonparametric strength and association between the two variables (Leclezio et al., 2014). Non-parametric testing was used because the sample did not meet normality assumptions. The correlation coefficients for Spearman rank-order range from -1 to +1, with values closer to 1 indicating a stronger relationship. The strength of the relationship should be interpreted as: 0.01-0.19 no relationship, 0.20-0.29 weak relationship, 0.30-0.39 moderate relationship, 0.40-0.69 strong relationship, and greater than or equal to 0.70 very strong relationship (Leclezio et al., 2014).

Results

Respondents indicated their level of agreement or disagreement with items on the GREEN scale (Haws et al., 2014). More than half of respondents (54.4%) somewhat agreed they would describe themselves as environmentally responsible. The majority of students also agreed or strongly agreed (69.1%) they were concerned about wasting the resources of our planet. Out of all items in the GREEN scale, the item with the lowest percentage agreement was that purchasing habits were affected by environmental concern, with only 2.9% strongly agreeing with the statement. However, 60.3% of respondents somewhat agreed or agreed that their purchasing habits were affected by these environmental concerns. The mean GREEN scale score revealed respondents somewhat agreed they had green consumer values ($M = 5.27$, $SD = 0.85$).

Table 2

Respondents' Green Consumer Values (N = 68)

	Strongly disagree %	Disagree %	Somewhat disagree %	Neither agree nor disagree %	Somewhat agree %	Agree %	Strongly agree %
I am concerned about wasting the resources of our planet.	0	0	2.9	2.9	25	38.2	30.9

It is important to me that the products I use do not harm the environment.	0	0	5.9	5.9	38.2	32.4	17.6
I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	0	2.9	4.4	16.2	30.9	32.4	13.2
I consider the potential environmental impact of my actions when making many of my decisions.	0	0	7.4	13.2	32.4	35.3	11.8
I would describe myself as environmentally responsible.	0	1.5	8.8	8.8	54.4	16.2	8.8
My purchase habits are affected by my concern for our environment.	1.5	4.4	14.7	16.2	41.2	19.1	2.9

Respondents indicated their personal process for making improvements (Dolansky et al., 2020). With the exception of one item, no respondent indicated they never engaged in systems thinking when seeking to improve a situation. Respondents indicated they often engaged in most systems thinking tendencies. A majority of students (89.7%) indicated the understanding of how a chain of events occurs is crucial in making improvements often or most of the time. The mean systems thinking scale score indicated respondents were often using systems thinking ($M = 61.26$, $SD = 8.67$) when they wanted to make an improvement.

Table 3
Students' Systems Thinking Tendencies (N = 68)

	Never %	Seldom %	Some of the time %	Often %	Most of the time %
I think understanding how the chain of events occur is crucial.	0	1.5	7.4	35.3	54.4
I keep in mind that proposed changes can affect the whole system.	0	0	7.4	45.6	47.1
I think more than one or two people are needed to have success.	0	2.9	20.6	33.8	42.6

I consider the cause and effect that is occurring in a situation.	0	1.5	8.8	45.6	41.2
I include others to find a solution.	0	0	10.3	51.5	38.2
I consider that the same action can have different effects over time, depending on the state of the system.	0	1.5	16.2	44.1	38.2
I think that systems are constantly changing.	0	2.9	19.1	41.2	36.8
I consider how multiple changes affect each other.	0	1.5	14.7	47.1	36.8
I think about how different individuals might be affected by the improvement.	0	0	14.7	48.5	36.8
I recognize system problems are influenced by past events.	0	0	2.35	41.2	35.3
I think small changes can produce important results.	0	0	20.6	44.1	33.8
I think recurring patterns are more important than any one specific event.	0	1.5	29.4	36.8	32.4
I see everyone's view of the situation.	0	2.9	17.6	48.5	30.9
I think of the problem at hand as a series of connected issues.	0	2.9	23.5	42.6	30.9
I look beyond a specific event to determine the cause of the problem.	0	1.5	14.7	54.4	29.4
I keep the overall mission and purpose of systemic changes in mind.	0	0	23.5	47.1	29.4
I consider history and culture related to potential actions.	0	1.5	23.5	45.6	29.4
I consider the relationships among stakeholders.	1.5	10.3	38.2	26.5	23.5
I try strategies that do not rely on people's memory.	0	16.2	33.8	30.9	19.1
I propose solutions that affect a particular environment, not specific individuals.	0	7.4	50	30.9	11.8

Spearman's rank-order correlation coefficient was computed to assess the association between respondents' green consumer values and systems thinking tendencies. There was a positive, yet weak, association between the two variables, which was statistically significant ($r_s(65) = .276, p = .029$; Leclezio et al., 2014).

Table 4
Spearman's Rank-Order Correlation Coefficient

	<i>N</i>	<i>r_s</i>	<i>df</i>	<i>p</i>
GREEN scale and Systems Thinking scale	67	.276	65	.029*

Note. * $p < .05$.

Conclusions, Recommendations, and Implications

To address the grand challenges associated with the world's broken food systems, those involved in food production must appropriately consider effects on the natural environment while striving to feed a growing population (*Future food systems: For people, our planet, and prosperity*, 2020). Future generations of agriculture and natural resources students are a vital part of creating these systemic changes that will address the world's wicked problems (Foster et al., 2014). Understanding the thought processes and values of Gen Z students is paramount in strategically equipping them to face interdisciplinary obstacles. The current study examined the systems thinking tendencies and green consumer values of Gen Z undergraduate students and explored the association between the two constructs. The results indicated respondents somewhat agreed they had green consumer values and often used systems thinking; however, only a weak association between the variables existed.

There are a few limitations to be addressed before the findings are further discussed. First, the present research was limited by a small sample size. Therefore, the results are not generalizable. Additionally, respondents were exposed to HCSs about sustainable seafood within the survey instrument in advance of answering the scales reported. Because the results from the HCS highlighted environmental, economic, community, and personal consequences about making certain choices within a system, respondents may have been more inclined to answer questions with these concepts in mind. Finally, all respondents were enrolled in classes within a college of agricultural and environmental sciences. While the respondents held a variety of majors in colleges across campus at a large university, enrollment in these specific courses and the course content may have affected their responses.

Acknowledging the limitations, the study does provide valuable insight as agricultural educators strive to explore the relationships between green consumerism and systems thinking. Respondents agreed it was important products did not harm the environment. The response item with the strongest agreement corresponded with concern over wasting the resources of the planet. The findings aligned with Gen Z's overall concern with climate change and protecting planetary resources (Deloitte, 2021). Respondents were less likely to agree their purchasing behaviors were influenced by concern for the environment. Even though Gen Z students are acquiring more purchasing power and attracting the attention of marketers (Priporas et al., 2017), the respondents were college students who generally have lower incomes. Green consumer values do tend to align with responsible management of personal finances (Haws et al., 2014); however, green consumer values do not account for the income level of college students, who may not be able to afford environmentally friendly products. Respondents also may perceive purchasing green products as inconvenient or misaligned with their brand preferences (Moser, 2015).

Respondents also indicated they engaged in practices associated with systems thinking at least some of the time when attempting to make an improvement within a situation with complex problems. Respondents agreed that most of the time in making improvements, understanding the chain of events is crucial. However, respondents less frequently indicated they consider the relationships among stakeholders. This could be because respondents were unsure about the definition of stakeholders or may not have considered all active stakeholders within a system. Respondents indicated they often think systems are constantly changing, which aligns with the Gen Z focus on innovation (Priporas et al., 2017). However, while students said they often or most of the time choose to include others to find a solution, this is contradictory to literature on

Gen Z that indicates students are focused on individualism (Schwieger & Ladwig, 2018). Overall, the students' scores were relatively high on the systems thinking scale.

The relationship between green consumer values and systems thinking was a weak, non-linear association. Though the relationship was weak, the association between the two constructs indicated a need for further investigation. The non-linearity of the relationship may be due to the positive responses Gen Z had toward certain constructs such as green consumerism. Literature has established that Gen Z is already concerned about the environment, and environmental conservation influences their purchasing habits (Deloitte, 2021). Because respondents were prone to indicate their engagement in beliefs and actions related to the environment as exhibited by the green consumer values scale, these findings may indicate the necessity of a new scale to better represent Gen Z's beliefs surrounding green consumption. In comparison to other generations, Gen Z has different concerns and tends to be more realistic about issues the world is facing related to climate change (Schwieger & Ladwig, 2018). As such, the existing scale may not accurately capture these students' values in order to compare them to systems thinking tendencies and utilize values in an agriculture and natural resources educational context.

While environmental consumption values seem to be relatively high among the respondents, systems thinking tendencies may be more nuanced and require further exploration. Respondents had no prior exposure to systems thinking in advance of taking this survey and may have responded differently with education surrounding the topic. Future research should utilize a pre-test, post-test methodology to explore how stable systems thinking tendencies remain after a systems thinking educational intervention related to specific wicked problems associated with agriculture and natural resources. This intervention might include an entire course focusing on the topic, an experiential learning internship incorporating systems thinking to introduce students to wide-reaching, complex industries over the course of a semester, or in a study abroad program that immerses students in complex global systems (Foster et al., 2014; Hunter et al., 2006).

Additionally, students could respond to the GREEN scale to see if their green consumer values remain stable over time or change to further explore the relationship between the two constructs. Future studies may additionally benefit from investigating the relationships between specific items related to green consumer values and systems thinking tendencies contained within the scale constructs. Examination of a larger sample size may reveal certain values that students hold do align with specific systems thinking tendencies. Exploring the relationships between these items may complement existing literature on teaching Gen Z college students. Further exploration can potentially provide educators with additional insights on adapting their teaching styles to students' values and systems thinking strengths. Finally, future studies should explore if students' systems thinking tendencies and green consumer values align with their actual behaviors. Students' perceptions of their actions may vary from reality, due to differences between intention to engage in a behavior and actually engaging in a behavior.

The findings from the current study indicated there is an association between students' green consumer values and their systems thinking tendencies, which requires further examination. Agricultural educators should find ways to further connect these two concepts through a socio-ecological framework (Pauley et al., 2019). Students' existing environmentally conscious attitudes and values may influence their willingness to incorporate these values into the way they

think about broader global contexts, those required for systems thinking and solving the world's wicked problems associated with agriculture and natural resources. Because Gen Z students already seem to value environmental issues, approaching these complex problems with a systems thinking framework may equip them to utilize this framework in additional situations. Exposure to a systems thinking framework also prepares students for an evolving workforce that must tackle interdisciplinary problems and consider how their solutions impact diverse audiences.

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SBAE Induction-Year Teachers' Self-Perceived Professional Development Needs: A Mixed Methods Study

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Abstract

School-based agricultural education (SBAE), like many other subject areas, suffers from a critical teacher shortage. Oklahoma has chosen to combat this shortage by offering temporary emergency teaching certifications with minimal qualifications and no requirements for professional development. Retention is also needed to stem the flow of novice teachers exiting the profession. Induction support through professional development is a necessary component to teacher retention. This study sought to address this issue using mixed methodologies. Using a convergent parallel model, preexisting instruments were used to gather Oklahoma induction-year SBAE teachers' (N = 29) sense of self-efficacy. From this population, five case study participants were selected for the qualitative phase. Interview transcripts were collected during two site visits to each case study participant. The areas of professional development needs varied widely between individuals. Personal, environmental, and behavioral factors played a part in determining the professional development needs for each SBAE induction-year teacher. Therefore, it is recommended professional development be tailored to the individual induction-year teacher. Mentoring and online resource banks have the potential to provide the necessary individualized professional development support of SBAE induction-year teachers.

Introduction and Literature Review

An estimated 100,000 teaching jobs were left unfilled by highly qualified applicants in the 2107-2018 school year (Gracia & Weiss, 2019). Rural and low-income schools bear a disproportionately large percentage of this teacher shortage (Addressing Teacher Shortages Act, 2019), contributing to an educational disadvantage for their students (Carver-Thomas & Darling-Hammond, 2019). School-based agricultural education (SBAE) is no exception to this problem (Smith et al., 2018). In fact, teacher shortages have been a chief concern for SBAE professionals since the federal inception of vocational agriculture courses in secondary schools over a century ago (Eck & Edwards, 2019). Considering the 557 SBAE teaching positions unfilled by qualified candidates and an average student-to-teacher ratio of 77:1, nearly 50,000 students nationwide were left without a fully certified SBAE teacher in 2018 (National Association of Agricultural Education (NAAE), 2018).

To combat this shortage, all 50 states have developed contingency certification pathways to broaden the teacher pool (Ingersoll, 2002; Ludlow, 2011). In addition to fast-tracking individuals to become educators, alternative certification seeks to diversify the teaching population (Evans, 2014) and recruit high achieving individuals (Straubhaar, 2019). Alternative certification, broadly defined, is often considered any and all certification pathways other than obtained

through a teacher preparation program offered through a four-year institution of higher education (Bowling & Ball, 2018; Ruhland & Bremer, 2002a). Great variations exist between states' qualifications for alternative certification as well as the entrance requirements between various alternative certification programs within each state (Foote et al., 2011). Ruhland and Bremer (2002a) assessed alternative certifications nationwide and identified nine classes of alternative certification, from a highly structured teacher in residence format to minimal temporary certification with no professional development requirements. This diversity in teacher preparedness and qualifications present difficulties for administrators, researchers, and policy makers in supporting alternatively certified teachers (Darling-Hammond, 2009).

Induction-year teachers, those who have been in the profession for less than a year, are expected to complete the same tasks with the same competency as their more experienced peers (Moore & Swan, 2008). Such expectations can lead to stressful situations for these neophyte teachers (Moir, 1999). Mundt (1991) connected positive experiences and support, or lack thereof, to their likelihood of induction-year teachers to be retained in the profession. Approximately 20% of all teacher attrition is induction-year teachers not returning to the classroom for a second year (Taie & O'Rear, 2015). This teacher retention issue must be addressed before school-based agricultural education (SBAE) will be able to address the teacher shortage (Guarino et al., 2006; Smith et al., 2019). Targeted, specific, and ongoing professional development for induction-year teachers has been shown to decrease teacher attrition (Smith & Ingersoll, 2004).

In addition to an alternative certification allowing individuals to teach as they are earning certification through accredited programs, Oklahoma grants emergency teacher certificates (Oklahoma State Department of Education, 2020). These are the least restrictive type of alternative certification (Gundersen & Karge, 1992). As outlined by the Oklahoma State Department of Education (2020), emergency certification requires a bachelor's degree in any field and a clean background check. These teachers are not associated with any teacher preparation program and have no professional development requirements associated with their certification (Oklahoma State Department of Education, 2020).

The number of teachers with alternative certifications is growing at an exponential rate, accounting for more than 30% of teachers nationwide (García & Weiss, 2019). From 2014 to 2017, the number of induction-year alternatively or emergency certified SBAE teachers increased more than 150% nationwide (Foster et al., 2015; Smith et al., 2018). A similar trend is evident in Oklahoma SBAE induction-year teachers, with emergency certifications for SBAE teacher tripling from 2017 to 2019 (NAAE, 2019).

Still, recruitment is only part of the solution to teacher shortages (Guarino et al., 2006). With 50% of teachers leaving the profession within five years, teacher retention must be addressed to staff America's classrooms with highly qualified educators (Haj-Broussard et al., 2016). Induction programs for novice teachers are a promising solution to bolster teacher retention (Smith & Ingersoll, 2004). Teacher induction programs designed to orientate novice teachers into the profession often include mentoring, workshops, collaboration opportunities, and administrative support (Beam, 2009). Like alternative certification programs, induction programs vary greatly with most programs lasting from one to three years (Smith & Ingersoll, 2004).

The induction-year requires the most support of any teacher career stage (Katz, 1972). No matter the depth or intensity of teacher preparation, induction-year teachers require additional training to adequately perform job duties (Moore & Swan, 2008). Across subject areas and grade levels, induction-year teachers commonly report needs in curriculum, classroom management, and pedagogy (Kennedy & Clinton, 2009). In addition to the common professional development needs of curriculum, classroom management, and pedagogy for induction-year teachers across subject areas (Kennedy & Clinton, 2009), SBAE teachers have professional development needs in differentiated instruction (Ruhland & Bremer, 2002b) and agricultural content knowledge (Smalley et al., 2019). Management of FFA and SAE programs introduce additional professional development needs for induction-year SBAE teachers (Moore & Swan, 2008), including topics such as SAE supervision (Sorensen et al., 2014), alumni support (Joerger, 2002; Myers et al., 2005), planning chapter events (Myers et al., 2005), SAE record keeping (Sorensen et al., 2014), and student motivation (Smalley et al., 2019). This professional development is commonly delivered through mentoring, induction programming, and seminar-like sessions (Moore & Swan, 2008; Shaha et al., 2015).

The delivery of professional development has a strong influence on its effectiveness (Shaha et al., 2015). Qablan (2019) suggested teacher professional development be grounded in andragogy, the science of teaching adult learners. Additionally, Chaudhuri et al. (2019) found effective professional development can serve as a mastery experience in proper instruction of content. Active learning, standards-based, reflective, and collaborative activities over several regular intervals as part of a coherent program have been shown to produce effective professional learning in teachers (Darling-Hammond et al., 2017; Garet et al., 2001; Smith et al., 2020).

A needs assessment is vital to properly plan and implement professional development opportunities such as induction programs (Beam, 2009; Borich, 1980; Garton & Chung, 1996; Joerger, 2002). Much of this research is conducted through survey procedures reliant on self-report data (Koziol & Burns, 1986). Commonly, SBAE research related to induction-year teachers' needs include researcher designed survey instruments listing multiple topics for professional development which ask participants to rate their perceived need for instruction in that area (Garton & Chung, 1996; Roberts & Dyer, 2004; Sorensen et al., 2014). These self-report data are useful to identify areas of interest but may not report true professional development needs (Koziol & Burns, 1986).

Does the additional teacher preparation prepare traditionally certified SBAE teachers better for these challenges, or do induction-year teachers require similar professional development across certification pathways? Although literature has been devoted to this topic, findings are inconsistent among studies (Bowling & Ball, 2018; Darling-Hammond et al., 2005). Roberts and Dyer (2004) found teachers with traditional certification reported higher self-perceived needs than those with alternative certifications. They proposed alternatively certified teachers may teach a narrower range of courses and “lack sufficient professional knowledge to accurately indicate their deficiencies” (Roberts & Dyer, 2004, p. 68). Another study found no statistically significant differences between self-reported professional development needs of traditionally and alternatively certified SBAE teachers (Swafford & Friedel, 2010). Stair et al. (2019) found no statistically significant differences between traditionally and alternatively certified teachers in all

areas but program management where traditionally certified teachers reported a greater need for training.

Other studies debate the importance of relevant experience in the content areas. Alternatively certified teachers are more likely to have work experience in their content field than recent college graduates with a traditional certification (Evans, 2015). For career and technical education instructors in particular, some educational professionals believe this experience is vital to effective teaching (Evans, 2014). Therefore, traditionally certified SBAE teachers may need professional development in agricultural content areas (Smalley et al., 2019). This study sought to describe the professional development needs of both traditionally and emergency certified teachers through a various methods.

Conceptual Foundation

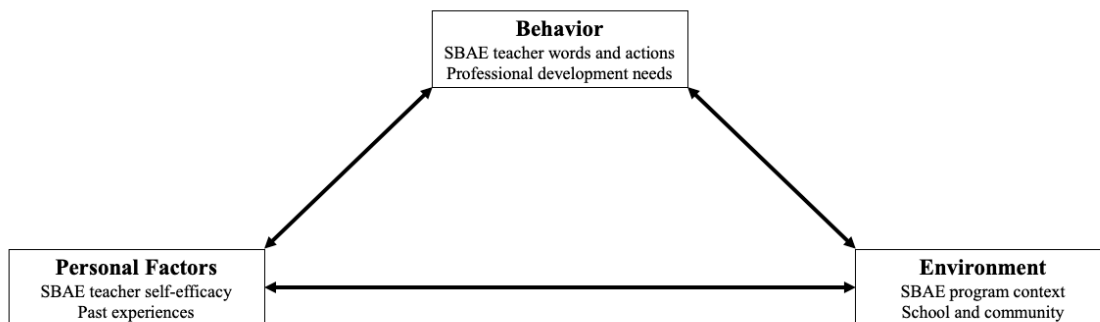
The theory of reciprocal determinism provided the conceptual framework of this study. Grounded in social learning theory (Bandura, 1978), reciprocal determinism describes the interconnectedness of personal factors, environment, and behavior (Bandura, 1997). These factors work together in a causal relationship with each influencing the other (Bandura, 1997). Personal characteristics, such as self-efficacy and affective states, are translated into behaviors which again impact personal characteristics (Maher et al., 2019). A person's behavior will influence their chosen environment, be that the physical and/or personnel surroundings (Salvador & Burciaga, 2017). Behaviors can be a result of the environment as people behave differently in various environments (Stewart et al., 1999). Lastly, environments may influence personal characteristics and vice versa (Wu et al., 2020).

Reciprocal determinism has been used to explain the connection between teacher self-efficacy, teacher behaviors, and student outcomes (Hivner et al., 2019). According to Bandura (1997), efficacious people are quick to take advantage of opportunity structures and figure out ways to circumvent institutional constraints or change them by collective action. Conversely, inefficacious people are less apt to exploit the enabling opportunities provided by the social system and are easily discouraged by institutional impediments (p. 6). Grad (2020) found this theory in practice with teachers who were more technologically literate also had higher rates of technology implementation. Smith (2005) theorized mentors could impact the behavioral and environmental factors of reciprocal determinism to change a preservice teacher's self-efficacy. A student's behavior and learning outcomes can be impacted by the teacher's behavior which is a part of the student's environmental factor (Apter, 2016).

Figure 1 contains a visual representation of the conceptual framework for this study. Behavior was defined as observed SBAE teachers' words and actions as well as their self-identified and observed professional development needs. Personal factors included their teacher self-efficacy gathered through the quantitative instrument and any relevant past experiences they divulged during interviews. Lastly, the environment was considered to be the SBAE program context including facilities, teaching partner(s), and students. The employing school district and community were also included in the environment factor. The interaction of these forces was studied in depth to develop support for induction-year teachers.

Figure 1

Conceptual Framework (Bandura, 1978; 1997)



Purpose and Research Questions

The purpose of this study was to explore the self-perceived PD needs of Oklahoma SBAE induction-year teachers using mixed methodologies. The study aligned with The American Association for Agricultural Education's (AAAE) third research priority addressing a professional workforce in the 21st century (Roberts et al., 2016). Three research questions guided the study.

1. What PD needs were reported in the quantitative survey instrument?
2. What PD needs were reported in the qualitative interviews?
3. How did quantitative and qualitative data points converge?

Methodology

A convergent parallel mixed methods study was designed to meet the purpose and research questions listed above, see Figure 2 (Creswell & Plano Clark, 2018). The population of interest for this study was induction-year SBAE teachers in Oklahoma during the 2020-2021 school year ($N = 29$). These individuals were in their first semester of teaching at the time of data collection. A list of new teachers was obtained from the Agricultural Education Division of the Oklahoma Department of Career and Technology Education (CareerTech). The list was vetted to ensure members had not taught any subject in any state before the 2020-2021 school year. This population frame was then used to make initial contact with all induction-year SBAE teachers.

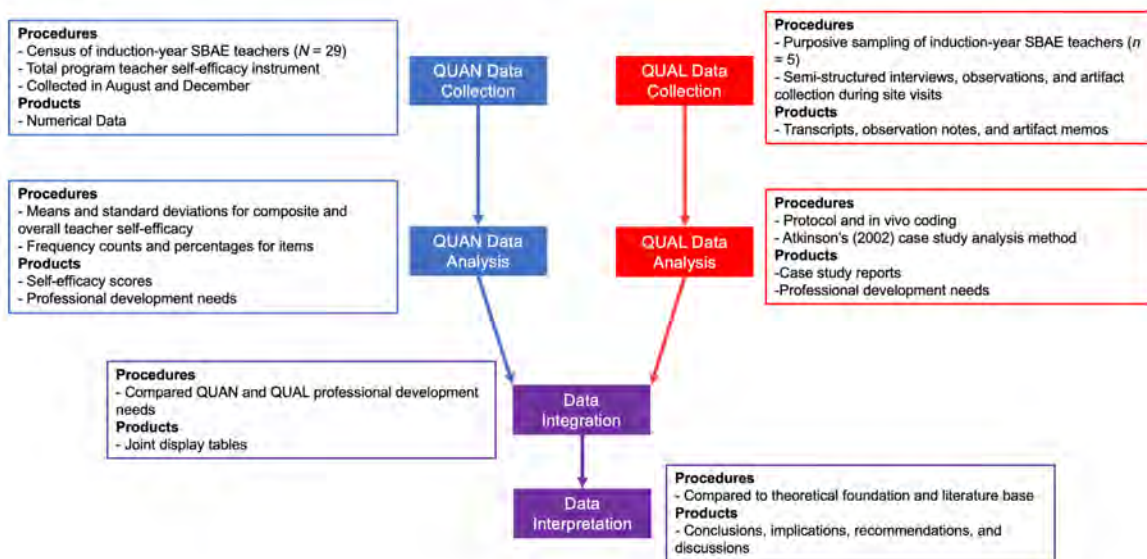
Phase 1 included quantitative measures with preexisting instruments. Wolf's (2011) and Rubenstein et al.'s (2014) instruments were combined and modified to fit the purpose study of the study. The resulting 60-item, 9-point Likert-type instrument was assessed for face and content validity by a panel of SBAE experts. Post-hoc reliability tests resulted in Cronbach's α of 0.86 for instruction items, 0.96 for FFA items, and 0.96 for SAE items, indicating a reliable instrument (Warmbrod, 2014). Face and content validity were addressed by a panel of four SBAE experts. Together they represented more than 80 years of experience within the SBAE profession. Quantitative data collection occurred in two rounds, first in August and again in December. Initial data collection resulted in 24 complete responses that equated to an 82.76% response rate. Following recommendations from Lindner et al. (2001) to account for non-

response bias, the responses were split in half with the first 12 participants to respond representing early responders and the last 12 labeled as late responders. No statistically significant differences, $t(22) = .40, p > .05$, Cohen's $d = 0.16$, were detected between early and late responders on total teacher self-efficacy scores. Therefore, it was determined findings were representative of the population (Johnson & Shoulders, 2017). Items in which participants indicated to have little capability were recorded as professional development needs.

Phase 2 comprised of a case study design. All Oklahoma induction-year SBAE teachers were invited to participate and enticed with a monetary compensation for their time. From those who volunteered, participants were chosen based on teacher certification route and proximity to the lead author. Five participants, two emergency certified and three traditionally certified, completed all parts of the study. Two site visits were conducted to each participant (Yin, 2018). Semi-structured interviews were conducted during each site visit with a protocol focused on induction-year teachers' experiences with challenges and successes within the SBAE program. Interview protocols were established with a base in the qualitative research questions of this study. A panel of experts in SBAE and qualitative research reviewed the protocols for trustworthiness and ethical concerns. All interviews were audio recorded and transcribed by hand. Data were analyzed using Atkinson's (2002) steps to analyze case study data. Cases were first analyzed separately, then compared across individual cases. The quantitative survey items served as a base for protocol codes (Atkinson, 2002; Saldaña, 2016) with in vivo coding used to address areas not reflected in the protocol codes (Saldaña, 2016). Trustworthiness was built into qualitative measures using Yin's (2018) case study approach. Construct validity, member checking, chain of evidence, theoretical foundation, and bracketing of researchers' past experiences as traditionally certified SBAE teachers improved the trustworthiness of this phase (Yin, 2018).

Figure 2.

Convergent Parallel Design



Once quantitative and qualitative data were analyzed separately, a joint display of both data forms was developed to assess areas of convergence and divergence between the two data sets. Legitimation, validity checks mixed methods, was addressed using inside-outside legitimation, weakness minimization legitimation, and multiple validities legitimation (Onwuegbuzie & Johnson, 2006). Member checking and peer audits increase the likelihood insiders and outsiders of the study will reach the same conclusions give the data collected (Onwuegbuzie & Johnson, 2006; Tashakkori & Teddlie, 2003). Weakness minimization legitimation uses the strengths of quantitative methodologies to mitigate the weaknesses of qualitative methodologies and vice versa (Onwuegbuzie & Johnson, 2006). Multiple validities accounts for the validity, reliability, and/or trustworthiness of the parts of a mixed methods study to account for the legitimacy of the whole (Onwuegbuzie & Johnson, 2006).

Reflexivity Statement

The lead author was traditionally certified to teach SBAE and did so for seven years. At the time of this study, the lead author had worked in teacher preparation in a traditional certification program for nearly three years. Therefore, personal background and experiences were carefully bracketed throughout the procedures to avoid potential bias.

Findings

Research Question 1 sought to report professional development needs from the quantitative survey instrument. SBAE teacher self-efficacy was found to be high in both traditionally and emergency certified teachers in the overall population, see Table 1.

Table 1

Teacher Self-Efficacy of Oklahoma Induction-Year SBAE Teachers

	Initial (<i>n</i> = 24)		Final (<i>n</i> = 21)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Instruction Teacher Self-Efficacy	6.75	0.75	6.73	0.92
FFA Teacher Self-Efficacy	6.94	1.21	6.98	1.29
SAE Teacher Self-Efficacy	7.31	0.88	7.36	1.00
Total Teacher Self-Efficacy	7.00	0.82	6.96	1.01

Note. Likert-type scale of 1 (no capability) to 9 (great deal of capability)

Responses from participants who completed all parts of the study were studied in detail. These data are displayed in Table 2. In both quantitative data collections, Participants 1, 2, and 3 reported no professional development needs. Participant 4 reported two needs in the areas of *assist FFA members in preparing proficiency applications* and *manage a horticulture laboratory/greenhouse*. Participant 5 reported three needs in the areas of *evaluate student learning*, *utilize a program advisory board*, and *utilize the FFA Alumni and Supporters*. Each of these areas were rated as no to very little capability by the respective participant.

Table 2.*Joint Display of Quantitatively and Qualitatively Reported Professional Development Needs*

Professional Development Needs	Participants				
	1*	2*	3+	4+	5+
Assist FFA members in preparing degree applications	Qual				
Assist FFA members in preparing proficiency applications				Quant	
Assist students completing a record of the financial transactions in their SAE project	Qual				
Assist students in acquiring necessary resources to complete an SAE project					Qual
Build positive relationships with administrators				Qual	
Clearly communicate the procedures of SAE projects with parents and employers		Qual			
Coach Leadership Development Events (speaking, parliamentary procedures, etc.)	Qual				Qual
Coordinate communication between a student, parent, employer, and myself		Qual			
Evaluate student learning					Quant
Identify SAE projects that connect to agriculture curriculum			Qual		
Manage a horticulture laboratory/greenhouse		Qual	Qual	Quant	
Manage student behavior			Qual		
Motivate students to learn	Qual				
Provide students meaningful supervision during their SAE project			Qual		
Recruit new FFA members		Qual	Qual		
Train a chapter officer team					Qual
Utilize a program advisory board				Qual	Quant
Utilize the FFA Alumni and Supporters			Qual	Qual	Quant

Note. * Indicates an emergency certified participant. + Indicates a traditionally certified participant. Qual = PD need identified in interview. Quant = PD need identified in survey.

The second research question examined professional development needs mentioned in qualitative interviews. Emergency certified participants reported a total of eight professional development needs during interview sessions. Participant 1 came to teaching as a second career after closing her agribusiness. Teaching in a small and supportive community, Participant 1 obtained an emergency certification after the school was unable to fill their open agricultural education position. Participant 1 stated, “we’re just learning as we go” (Interview 2, Line 275) in relation to *assist FFA members in preparing degree applications* and *assist students completing a record of the financial transactions in their SAE project*. During the second visit, Participant 1 reflected on her ability to *coach Leadership Development Events*, “We did a few activities this fall, what was offered anyway... They did alright. I thought they could do better” (Interview 2, Line 266-267).

Participant 1 expressed concern and discouragement in *motivating students to learn* through her statements of “I just don’t understand why students wouldn’t want to work” (Interview 1, Line 409) and “I have the kids who want to show [exhibit livestock] and they want to work and be active... and the others, man, they’re just not doing anything” (Interview 2, Lines 246 & 248).

Participant 2 was emergency certified and recognized four areas of professional development needs in interviews. Graduating with a degree in animal science, Participant 2 accepted a teaching position from a motivation to continue an involvement with the livestock show industry. After describing a reoccurring issue with students’ SAE projects, *clearly communicate the procedures of SAE projects with parents* and *coordinate communication between a student, parent, and SBAE teacher* emerged as professional development needs. In relation to *managing a horticulture laboratory/greenhouse*, Participant 2 remarked, “I don’t really know what to have them [greenhouse management class] do,” he said (Interview 2, Line 143). Lastly, Participant 2 noted a need to *recruit new FFA members*. “I’d like to see more students become involved. We’re a small school, but there’s lots of room to grow” (Interview 2, Line 96). “It’s been tough to do much. With distance learning and events canceled cause of the ’Rona” (Interview 2, 180).

Participant 3 was traditionally certified and described six professional development needs in interviews. Teaching in a multiple teacher department, Participant 3 taught a variety of agriscience, agricultural communication, and plant science classes. She expressed discomfort in supervising various SAE projects (Interview 1, Line 43), leading to professional development needs in *identify SAE projects that connect to agriculture curriculum* and *provide students meaningful supervision during their SAE project*. *Recruiting new FFA members* was a struggle for Participant 3, partly due to distance learning and decreased FFA calendar (Interview 2, Line 64). In discussing *utilizing the FFA Alumni and Supporters*, Participant 3 noted of her local organization, “I’m a female. I’m new and I think those are all things that are just different here... new factors that really contributed to maybe my acceptance here” (Interview 1, Lines 109-111). Participant 3 described difficulty in *managing a horticulture laboratory/greenhouse* and *managing student behavior*, especially in relation to the horticulture class. “I was a deer in headlights. I didn’t necessarily know what to do with them” (Interview 1, Lines 136-137). “They’re my most difficult students by far... most days with them are a struggle from the word go” (Interview 2, Lines 104 & 106).

Participant 4, a traditionally certified SBAE teacher, described three professional development needs during interview sessions. Participant 4 was employed by a medium sized program with an active FFA chapter. This participant seemed to struggle to *build positive relationships with administrators* by describing ongoing issues with the principal and superintendent. “(Principal) just goes along with (Superintendent) and (School Board Member)... (Administrators) haven’t been any help really” (Interview 2, Lines 550, 552). “We just get told what we’re doing wrong, not ‘Good job for this’ or ‘Thanks for that’” (Interview 2, Line 554). Participant 4 complained about the workload and regularly working 50 to 60 hours each week, “(the extra hours) have changed me in a lot of ways... It wears on you” (Interview 2, Line 436). Yet Participant 4 did not *utilize the FFA Alumni and Supporters* or *program advisory board*. “No, we don’t have any kind of (advisory board)” (Interview 1, Line 202).

Participant 5 was traditionally certified and qualitatively expressed three professional development needs. This participant held a variety of agriculturally-related positions during a brief intermission after graduation and before entering the classroom. In an economically depressed area, Participant 5 was concerned with *assisting students acquiring necessary resources to complete an SAE project*, “(students) don’t have much... for them, show animals are not an option” (Interview 1, Lines 103 & 107). Participant 5 indicated he was unable to *coach LDEs* in a sufficient matter to be prepared for contests (Interview 2, Line 45). *Training an FFA chapter officer team* was difficult for Participant 5. Issues in this area emerged from the beginning of the semester, “They’re not the team I would have picked,” (Interview 1, Lines 163-164) and continued to plague Participant 5 (Interview 2, Line 53).

The third research question sought to describe where the quantitative and qualitative data converged and diverged to describe self-perceived professional development needs of Oklahoma induction-year SBAE teachers. There were no areas of convergence between survey and interview data. Participants 1, 2, and 3 reported no needs on the quantitative survey. Each participant reported professional development needs in the interviews, but none matched what they had reported on the survey instrument. Emergency certified participants each reported four professional development needs while traditionally certified participants reported five to six professional development needs.

Conclusions, Implications, and Recommendations

Discrepancies were found in reported professional development needs for these induction-year SBAE teachers acquired through quantitative and qualitative means. Environmental influences may attribute to the differences in quantitative and qualitative responses (Moeller et al., 2015). Survey instruments and interviews were conducted at different times. As induction-year teachers are in survival mode with a short focus on present challenges (Katz, 1972), these participants may have been reporting what they saw as a present problem, rather than reflecting on past issues or future obstacles. Future research in which surveys and interviews are collected in the same day may reduce this discrepancy.

Research comparing self-reported professional development needs of emergency (or alternatively) certified and traditionally certified SBAE teachers yields conflicting conclusions. Roberts and Dyer (2004) found traditionally certified teachers reported more professional development needs than alternatively certified teachers. Conversely, Swafford and Friedel (2010) and Stair et al. (2019) noted no statistically significant differences in professional development needs between traditionally and alternatively certified SBAE teachers. The diverse professional development needs identified by these traditionally certified teachers mirror the findings of Sorensen et al. (2014). In addition to their classroom instruction responsibilities, induction-year SBAE teachers are required to manage the total SBAE program including FFA advisement and SAE supervision (DiBenedetto, et al., 2018). Therefore, professional development offerings should represent all areas of the three-circle agricultural education model and occur at regular intervals with topics arranged to meet the demands of teachers’ schedules and topics of interest.

Emerging professional development needs were highly individualistic. Bandura’s (1978) theory of reciprocal determinism may help explain these differences. In his model, Bandura (1978)

proposed environment both influences and is influenced by personal characteristics and behaviors. The differing environments (SBAE programs) and personal characteristics (teacher self-efficacy) influenced the various professional development needs emerging from each case participant (Greiman et al., 2005; Katz, 1972; Smith & Ingersoll, 2004). To best maximize the resources of Oklahoma SBAE staff, teacher educators, administrators, and teacher professional development providers, induction-year teachers should be provided a mentor to individualize induction-year support (Smith & Ingersoll, 2004). This mentor-protégé relationship is likely to increase reflective skills, improve SBAE program management, and retain novice teachers (Toombs & Ramsey, 2020). By addressing the professional development needs listed above, Oklahoma induction-year SBAE teachers are likely to increase their teacher self-efficacy and improve the retention rate of novice professional (Bandura, 1997).

The difference in self-reported professional development needs across data type may indicate potential pitfalls in the use of a single research methodology in conducting professional development needs analyses, especially regarding induction-year teachers. Most of these studies are done with a single quantitative survey (Di Benedetto et al., 2018). As in the case of this study, qualitative data may provide additional areas of concern for induction-year teachers they were not able to express in a quantitative matter. Therefore, it is recommended professional development providers consider conducting needs analyses using mixed methodologies.

Discussion

The findings of this study indicate induction-year SBAE teachers in Oklahoma require professional development, regardless of their awareness of their needs. The focus of those needs varied greatly between individuals. Therefore, it is imperative induction-year teachers are provided personalized, easily accessible professional development resources. Traditional professional development, unfortunately, is commonly neither personalized nor easily accessible when needed (Clarke & Hollingsworth, 2002). The typical workshop-type offerings are often expensive and ineffective (Shaha et al., 2015). The current state of Oklahoma SBAE's induction programming is based on this traditional professional development model with statewide meetings of SBAE induction-year teachers to cover various topics throughout the year (Oklahoma CareerTech, 2020). One case study participant praised the program offerings while the other four expressed frustrations with the content and pacing of the workshops.

Oklahoma SBAE induction-year teachers need additional support. This study recommends implementation of an induction program based on mentoring and on-demand resources. A mentor can provide personalized reflection and feedback and positively impact student outcomes (Smith & Ingersoll, 2004). Mentoring can take various forms, from organic relationships between SBAE teachers to structured programs with assigned mentor-protégés groupings (Hudson & Hudson, 2018). The spontaneous mentoring relationships built between induction-year and experienced teachers can be very fruitful for both parties (Mukeredzi, 2017) and was identified by four of the five case study participants. However, these relationships are sometimes limited by the appropriateness of mentor choice (Toombs & Ramsey, 2020). Assigned mentors are more able to ensure quality advice (Peiter et al., 2005) but are highly influenced by the relationship between mentor and protégé (Hudson & Hudson, 2018). Mukeredzi (2017) suggested mentoring cohorts with two to three induction-year teachers grouped with one or two

experienced teachers to mitigate interpersonal issues that can plague assigned mentoring relationships. As a previous Oklahoma state-wide mandated induction mentoring program was defunded by the state budget cuts (McKean, 2013), financial support for a new mentoring program should come from more stable resources, including Oklahoma CareerTech, Oklahoma SBAE teacher education programs, Oklahoma FFA Association, and Oklahoma SBAE teacher associations.

In addition to an assigned mentor, Oklahoma induction-year SBAE teachers need easily accessible information resources. An on-demand professional development model in the form of online resource banks have been effective in recent years (Shaha et al., 2015). Shaha and Ellsworth (2013) studied this just-in-time technique of delivering professional development and found a positive correlation between teacher engagement in the professional development and student outcomes. A free, searchable, comprehensive, and engaging platform to serve as an online research bank for SBAE teachers does not yet exist. Its creation would serve as a valuable tool for both novice and experienced SBAE teachers. This database would require continuous updating as new resources become available (Shohel & Banks, 2012). Additionally, items must be vetted to ensure quality and usability of the resources (Ferman, 2002). Oklahoma teacher certification programs would be in a position to serve these roles. To promote use of the resource bank by novice and experienced SBAE teachers, professional certificates could be issued for a set number of modules or hours completed. Induction-year teachers should have mandated use of the bank with certain modules required and a set number of elective modules to be set by Oklahoma teacher educators and CareerTech staff. The investment in Oklahoma's induction-year SBAE teachers, both emergency and traditionally certified, by the state department of education, Oklahoma CareerTech, SBAE teacher educators, inservice SBAE teachers, and the Oklahoma FFA Association will pay dividend in teacher retention and student learning for years to come.

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Perceptions of Pre-service Teachers' Ability to Use AET as a Data Management System

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An increased emphasis has been placed on teaching financial literacy at the secondary level. SBAE teachers have a unique opportunity to teach students about maintaining records and managing data. The AET is used nationwide by SBAE teachers to teach students how to manage finances and keep proper records. The purpose of the study was to describe the self-perceived and actual efficacy of pre-service SBAE teachers toward operating and managing student projects through The AET. Forty-two pre-service SBAE teachers from Oklahoma State University were instructed in the use of The AET. The study measured the students' perceived self-efficacy to use The AET at three points during the 16-week semester. Results showed that students' self-perceived abilities and actual abilities to use The AET increased across all areas throughout the semester. However, while their actual ability to use Financial Applications in The AET increased across all three observations, their mean scores were still below a 60%, indicating a failing grade. It is recommended the state office of career and technical education in Oklahoma be alerted to the actual competency and self-efficacy levels of the new teachers in the state so that appropriate professional development may be provided once these students enter the teaching ranks.

Introduction

Debate exists on whether financial literacy should be taught as a stand-alone course or by integrating it into other curricular areas (Totenhagen et al., 2015). Financial literacy is a critical piece of being a productive member of society in a culture that requires one to be responsible and self-sufficient (Shim et al., 2009). It is imperative that adolescents learn about finance to best prepare them for the transition to adulthood (Shim et al., 2009). The interest in financial literacy in U.S. schools has gained popularity since the 1990s (Walstad et al., 2010). In 2022, 25 states required students to take a course in economics (CEE, 2022). Additionally, 23 states required a course in personal finance to graduate, which is up only two states from the previous years. Although students in those 23 states are required to take a course in personal finance to graduate, only nine states have developed dedicated courses in personal finance compared to only six in 2020 (CEE, 2022). CEE President Nan J. Morrison stated there is still more that needs to be done to prepare students in the areas of economics and personal finance before leaving high school (CEE, 2022). Since 2011, only three additional states have begun requiring economics for graduation, and fewer states are requiring students to be tested in economics in 2022 than in 2011 (CEE, 2022). Regardless, what is understood about financial literacy is that educators should provide students with active and engaging learning experiences where they invest their own money and make decisions and apply concepts related to managing it appropriately and, at a minimum, should include topics related to budgeting, saving, investing, and credit (Totenhagen et al., 2015). Parents, schools, and entrepreneurs should create partnerships that are dedicated to teaching youth sound financial practices (Shim et al., 2009). Walstad et al. (2010), identified that a properly implemented program aimed at financial literacy can significantly impact the

knowledge of high school students regarding finances. In addition to financial literacy programs at the secondary level, Shim et al. (2009) identified that parents and work experience played a role in students' behavior toward their understanding of financial concepts and that early financial socialization is key to increasing financial attitudes and behaviors (Shim et al., 2009).

School-based agricultural education (SBAE) provides opportunities for students to manage data and maintain records on their agricultural enterprises and projects. In fact, The National Council for Agricultural Education (2011) found the topic so important they included personal financial planning and management as a mandate for each Foundational type of supervised agricultural experience (SAE) for students. The goal of the National Council for Agricultural Education (2011) is to have 100% SAE engagement among students. Due to the opportunity to acquire financial planning and management skills through SAEs, *SAE for All* was developed to serve as a resource for SBAE teachers to use in their classrooms (The National Council for Agricultural Education, 2011). In addition to adding financial planning as a mandate for SAE projects, the National Council for Agricultural Education's (2015) revision of the National Agriculture Food and Natural Resources (ANR) Content Standards included adding the management of personal finances to the Career Ready Practices content standards. Even so, teaching financial literacy to students has been, and continues to be, a long-lasting struggle for SBAE teachers (Foster, 1986; Layfield & Dobbins, 2002; Miller & Scheid, 1984; Sorensen et al., 2014; Toombs et al., 2020).

Brown and Knobloch (2022), identified that the use of simulation by SBAE teachers to teach business management skills was better at increasing students' financial literacy compared to playing a game about business management. This helped to support the notion that SBAE teachers have a unique opportunity to use SAEs to simulate business management skills to effectively instill financial literacy skills in students (Brown & Knobloch, 2022).

Goodnough and Hung (2008) stated that "effective teaching involves having solid subject knowledge of a discipline, as well as an in-depth understanding of how to facilitate student learning withing that discipline" (p. 63). Rice and Kitchel (2015) identified that years of teaching experience in a content area and their experience in the content play a role in the ability of teachers to effectively teach students in a specific content area. They posited that teacher preparation programs have an impact on teachers' ability to teach specific content (Rice & Kitchel, 2015). One factor impacting how teachers choose to teach content is based on how they were taught the content, emphasizing the importance of understanding teacher preparation programs as a fundamental piece of teachers' pedagogical content knowledge (Rice & Kitchel, 2015). For this study, understanding the pre-service SBAE teachers' experience using financial literacy software can help us identify their perceived self-efficacy using the software. The use of simulation activities in SBAE can enhance interests of students in entrepreneurship and business management, and increase their financial literacy (Brown & Knobloch, 2022).

The AET

The Agricultural Experience Tracker (The AET), released in 2007, is a data management system designed to assist SBAE instructors teach aspects of record keeping to students regarding their SAEs (The Agricultural Experience Tracker, 2017). Although numerous states have adopted The AET as their primary data management system for FFA members, research continues to support

the fact that teachers are ill equipped and need professional development to use it appropriately (Ferand et al., 2020; Sorensen et al., 2014; Toombs et al., 2022). According to Aviles (2015), SBAE teachers found The AET to be complex and taking too much time, which supports the need for additional training and experience in using it.

In their study of agricultural education teachers in Oregon, Sorensen et al. (2014) found that using The AET was one of the highest in-service needs of both early-career (i.e., those with less than six years of experience) and experienced teachers (i.e., those with six or more years of experience). What is more, research has indicated that preservice teachers have a low amount of overall self-efficacy related to managing the financial data aspect (i.e., record books) of their students' SAEs (Toombs et al., 2022), signifying a need for further inquiry in this field.

The AET is used nationwide by SBAE teachers and students to assist in the acquisition of record keeping skills in time and finance (Hanagriff, 2022). The goal of The AET is to track FFA and award-related experiences as well as actual educational experiences occurring in SBAE programs. In 2021, more than 8,000 SBAE and FFA programs and 1.1 million SBAE students used The AET to assist in tracking Supervised Agricultural Experiences (SAEs), recording FFA activities, and creating and managing FFA award applications (Hanagriff, 2022).

The AET (2023) aligns with the three-circle model of agricultural education and is often supported through the use of Perkins and state-curricular funding. As a result, The AET has been adopted by 91% of all SBAE and FFA Programs across the U.S. (Hanagriff, 2022). In Oklahoma, SBAE teachers are required to use The AET to track student data and generate FFA-related reports (R. Bonjour, personal communication, April 13, 2017). Oklahoma SBAE teachers began using The AET when House Bill (HB) 3009 was passed in 2014 that required all SBAE students to maintain an SAE (Aviles, 2015).

Other states have also adopted The AET with varying degrees of success. Of the 56 teachers in New Mexico who used The AET, Thoron et al., (2020) identified that their level of familiarity with it was woefully lacking. As such, the authors recommended that teacher preparation programs prepare teachers to use resources, such as The AET, to meet the goals of their students. The point is valid, as all teachers should be trained on how to access curricular resources and how to evaluate them for use with their students (Mercier, 2015).

Consistent with this theme, Totenhagen et al. (2015) and Brown and Knobloch (2022) posited that the use of interactive learning experiences and curriculum integration are the best methods for delivering financial literacy content to students. In their mixed-methods study of The AET on a multi-week project of raising broiler chicks, Toombs et al. (2022) found that students struggle with integrating The AET into their curriculum and that additional research is warranted to determine why. Despite the widespread adoption of The AET by SBAE teachers across the country, little research exists regarding preservice teachers' self-efficacy for using it. Additionally, research assessing teacher preparation programs' ability to effectively prepare preservice teachers to instruct students in The AET has been largely left out of the cannon of agricultural education research. With the heavy expectation to integrate The AET into SBAE programs, what impact can a semester-long course have on students' self-perceptions to use it?

Theoretical Framework

Bandura's (1977) Self-Efficacy Theory guided the study. Self-efficacy is the belief a person has in his or her ability to perform a specific task or tasks (Bandura, 1977). It is based on repetition of completing the task with the assistance of a mentor. Self-efficacy can increase with a person's successes and decrease with their failures to complete the task (Wilson et al., 2020) and is largely dependent on an individual's continual effort, devotion, and behavior toward the task (Walumbwa et al., 2011). Four sources impact a person's self-efficacy (Bandura, 1994). These sources include mastery experiences, psychological arousal, vicarious experiences, and verbal persuasion. Mastery experiences provide the greatest opportunity for increased self-efficacy when individuals succeed at, or accomplish, a task. Vicarious experiences aid in improving self-efficacy when individuals are involved in the experience of observing others (i.e., models) successfully complete a task. Verbal persuasion is produced through encouragement and occurs when individuals are told they ". . . have what it takes to succeed" (Bandura, 1994, p. 3). Physiological arousal is related to how individuals react to the situations they encounter (Bandura, 1994). With the need to increase financial literacy among students in the American school system, and the role SBAE teachers can play in creating such authentic learning opportunities and experiences, it is important to assess students who aspire to be SBAE teachers on their self-perceived and actual ability to use The AET.

Background of the Study, Purpose, and Objectives

AGED 3203: Advising Agricultural Student Organizations and Supervising Experiential Learning is a junior-standing course for preservice teachers that is focused on aspects of FFA and SAE and designed to help address such needs. The course includes laboratories where students engage with all aspects of the program, such as advising a local FFA Chapter, supervising student projects, and managing data through The AET, where students log entries, produce reports, and complete award applications from fictitious data sets. Such experiences are designed to prepare students for their future expectations as SBAE teachers once they enter the academy. As such, *AGED 3203* seeks to improve student knowledge and experiences related to financial literacy and data management using The AET. The course description is as follows:

AGED 3203 ". . . is designed to determine the resources and trends of local communities with respect to agricultural production and agribusiness. Emphasis will be placed on agricultural education program policies, FFA chapter advisement, planning and managing the instructional program, and the identification and completion of records and reports required of a teacher of agricultural education in Oklahoma." (Robinson, 2022, p. 1)

The larger aim of the course is to prepare preservice teachers for implementing effective FFA and SAE programs at the secondary level. Such preparation includes teaching students to use The AET to track their data in hopes of becoming financially literate. To do so, preservice teachers must feel efficacious at using The AET. Yet, research has indicated that some people tend to overestimate their efficacy (Woolfolk Hoy & Spero, 2005). It may be possible others underestimate their efficacy. To support such a claim, Robinson and Edwards (2012) assessed the teaching self-efficacy of first-year traditionally and alternatively certified SBAE teachers. They found that traditionally certified teachers consistently outperformed their alternatively certified teaching counterparts when assessed by a third-party observer. Although, their actual

performance indicators were statistically significantly higher, their self-perceived ratings were lower when compared to their fellow alternatively certified teachers. The authors attributed this difference to the fact that alternatively certified teachers had not been prepared in pedagogy and as such did not know what they did not know about teaching. Therefore, the purpose of the study was to describe the self-perceived and actual efficacy of pre-service SBAE teachers toward operating and managing student projects through The AET. The study was guided by the following research objectives:

1. Describe the personal characteristics of students enrolled in the course,
2. Describe the perceived self-efficacy of pre-service SBAE teachers to use The AET for managing student projects; and
3. Describe the abilities of preservice SBAE teachers to use and advise students in The AET.

Methods

The study was approved by the Oklahoma State University Institutional Review Board (IRB) on January 26, 2022. This manuscript is based on data presented at the meeting of the Southern Association of Agricultural Scientists (Price et al., 2023). All students ($N = 42$) enrolled in the junior-level *AGED 3203* at OSU during Spring 2022 were invited to participate in the study. Participation in the study was voluntary and students' final grade was not affected by their consent to participate or not. Links to the questionnaire were made accessible to the students through the learning management system *Canvas* for one class day for students to complete. The use of classroom announcements and text reminders were used to recruit participants.

Three points of data were collected. The first observation ($n = 41$) was conducted at the beginning of the semester (Week 1). The second observation ($n = 41$) was conducted at the midpoint of the semester (Week 8), and the third observation ($n = 32$) was conducted at the end of the semester (Week 16). Students completed a questionnaire using Qualtrics regarding their perceived self-efficacy for using The AET.

The questionnaire included personal characteristic questions and 22 statements regarding their perceived self-efficacy to perform various competencies in the AET. Each competency statement was rated on a 5-point, Likert-type scale ranging from 1 *Strongly Disagree* to 5 *Strongly Agree*. Statements were derived from The AET *Quizizz* assessments; 22 complementary statements were developed to determine the perceived self-efficacy of the participants when using The AET. For example, one question on the *Quizizz* asked, "As an FFA officer, where do you record your officer meetings and chapter meetings?" The complementary perceived self-efficacy statement was "Log FFA Activities." Another *Quizizz* example was, "After logging into your AET, (blank) should be completed 100% before beginning any other entries." The complementary perceived self-efficacy statement was, "Create a student AET profile."

After completing the questionnaire to measure their perceived self-efficacy, the participants then completed three The AET *Quizizz* assessments to measure their actual self-efficacy. The three AET *Quizizz* assessments addressed student knowledge of The AET icons, financial applications, and record book terms. The questionnaire and three assessments were all taken at each observation period – Weeks 1, 8, and 16.

Descriptive statistics, including central modes of tendency (means and standard deviations) and variability (frequencies and percentages), were used to analyze the data. Personal characteristics included student type (traditional four-year or transfer), FFA degree(s) obtained, FFA office(s) held, and years of FFA experience. Student perception data were analyzed by recording the mean and standard deviation for the group at each of the three observation points. The change in mean scores between observations one and three were calculated to determine the change in perceptions from the beginning to end of the semester.

Results/Findings

Objective one sought to describe the personal characteristics of the students enrolled in *AGED 3203*. The personal characteristics of the students are presented in Table 1. One-half ($f = 21$) were traditional, four-year students with the other one-half ($f = 20$) being transfer students. One-quarter ($f = 36$) of the students had received their Greenhand award, and 33 (23%) had received their State FFA Degree. Thirty-two (68%) had served as a Chapter FFA Officer, two (4.26%) had served as a District FFA Officer, and three (6.38%) had served as a State FFA Officer. Seven (17%) had been a State Proficiency Finalist, 19 (45.24%) had been a FFA member for five years, and 15 (35.71%) had been a FFA member for at least four years (see Table 1).

Table 1

Personal and Professional Characteristics of Participants (N = 42)

Characteristics	<i>f</i>	%
Type of College Student		
Traditional, four-year OSU student	21	50.00
Transfer student	20	47.62
Did not answer	1	2.38
FFA Degrees Obtained		
Discovery	19	13.20
Greenhand	36	25.00
Chapter	35	24.31
State	33	22.92
American	16	11.11
Did not answer	1	0.69
Officer Positions Held		
Chapter FFA Officer	32	68.09
District FFA Officer	2	4.26
Area FFA Officer	1	2.13
State FFA Officer	3	6.38
National FFA Officer	0	0.00
Not an officer	8	17.02
Did not answer	1	2.13
State Proficiency Finalist		
Yes	7	16.67

Characteristics	<i>f</i>	%
No	34	80.95
Did not answer	1	2.38
Years of FFA Membership		
5 years	19	45.24
4 years	15	35.71
3 years	3	7.14
2 years	1	2.38
1 year	0	0.00
I was not an FFA Member	3	7.14
Did not answer	1	2.38

Objective two sought to describe the perceived self-efficacy of pre-service SBAE teachers to use The AET for managing student projects. Mean scores were compared across observations. To determine overall change of students' self-perceived efficacy in The AET, mean difference (*MD*) scores were computed by subtracting the mean score in Observation 3 with the mean score in Observation 1 (see Table 2). In all, student perceptions ranged from the real limits of *disagree* to *agree* on all statements in Observation 1 and increased from *neither agree* or *disagree* to *strongly agree* in Observation 3.

Table 2

Perceived Self-Efficacy of Students (N = 42)

Statement	Observation 1		Observation 2		Observation 3		<i>MD</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Log FFA Activities	3.71	0.89	4.21	0.71	4.34	0.59	0.63
Enter Journal Entries	3.68	0.92	4.36	0.61	4.53	0.56	0.85
Enter Financial Entries	3.66	0.90	4.29	0.76	4.25	0.83	0.59
Log Community Service Activities	3.61	0.98	4.02	0.71	4.19	0.88	0.58
Create a Student AET Profile	3.59	1.08	4.26	0.62	4.19	0.77	0.60
Log FFA Offices	3.39	1.06	3.74	0.98	4.06	0.93	0.67
Create an AET Resume	3.22	1.02	3.55	0.96	3.97	0.92	0.75
Use the AET Portfolio	3.17	0.96	3.78	0.92	4.13	0.78	0.96
Advise Students in completing State FFA Degree Applications	3.07	1.09	3.74	1.09	3.84	1.03	0.77
Log FFA Committees	3.05	1.10	3.55	1.12	4.03	0.88	0.98

Statement	Observation 1		Observation 2		Observation 3		MD
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Advise Students' Entrepreneurship SAEs	3.05	1.01	3.93	0.88	4.03	0.81	0.98
Advise Students' Foundational SAEs	2.95	1.03	3.98	0.80	4.13	0.86	1.18
Advise Students' Placement SAEs	2.88	0.97	3.93	0.91	4.06	0.83	1.18
Advise Students' School-Based Enterprise SAEs	2.80	1.02	3.86	0.97	3.94	0.83	1.14
Advise Students' Research SAEs	2.76	0.98	3.79	0.91	3.97	0.81	1.21
Advise Students' Service-Learning SAEs	2.76	0.93	3.81	0.96	3.94	0.83	1.18
Advise Students in Completing Proficiency Applications	2.76	1.01	3.71	0.96	3.81	0.96	1.05
Using the Breeding Herd Manager	2.73	1.15	3.69	0.91	3.66	0.96	0.93
Advise Students in Completing American FFA Degree Applications	2.63	1.01	3.52	1.14	3.61	1.13	0.98
Use the Market Manager	2.46	0.99	3.60	1.02	3.69	0.98	1.23
Advise Students in Completing Agriscience Fair Applications	2.46	1.06	3.26	1.14	3.44	1.14	0.98
Advise Students in Completing National Chapter Award Applications	2.33	1.03	3.19	1.18	3.59	1.31	1.26

Note. 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree*; MD = Mean Difference score between Observations 1 and 3.

The highest mean score for students in Observation 1 was Log FFA activities ($M = 3.71$, $SD = 0.89$), followed by Enter journal entries ($M = 3.68$, $SD = 0.92$), and Enter financial entries ($M =$

3.66, $SD = 0.90$). Advise students in completing National Chapter Award applications ($M = 2.33$, $SD = 1.03$) was the statement that had the lowest mean score for Observation 1 (see Table 2).

Regarding Observation 2, Enter journal entries ($M = 4.36$, $SD = 0.61$) had the largest mean score, followed by Enter financial entries ($M = 4.29$, $SD = 0.76$), and Create a student AET profile ($M = 4.26$, $SD = 0.62$). Advise students in completing National Chapter Award applications ($M = 3.19$, $SD = 1.18$) was the statement that had the lowest mean score of Observation 2 (see Table 2).

Regarding Observation 3, Enter journal entries ($M = 4.53$, $SD = 0.56$) had the largest mean score, followed by Log FFA activities ($M = 4.34$, $SD = 0.59$), and Enter financial entries ($M = 4.25$, $SD = 0.83$). Advise students in completing National Chapter Award applications ($M = 3.59$, $SD = 1.31$) was the statement that had the lowest mean score of Observation 3 (see Table 2).

Students experienced the greatest amount of perceived growth in the areas of National Chapter Award Applications ($MD = 1.26$), Use the market manager ($MD = 1.23$), and Advise students' research SAEs ($MD = 1.21$). The least amount of perceived growth occurred in the ability to use AET to Log community service activities ($MD = 0.58$), Enter financial entries ($MD = 0.59$), and Create a student AET profile ($MD = 0.60$). All statements experienced a positive increase in student self-efficacy mean scores from Observation 1 to Observation 2. The majority of the statements also experienced an increase from Observation 2 to Observation 3. However, Enter financial entries, Create a student AET profile, and Using the breeding herd manager all experienced slight decreases in mean scores from Observation 2 to Observation 3, but these values were still greater than their mean scores detected in Observation 1 (see Table 2).

Objective three sought to determine students' actual ability to identify features and use The AET as a curricular resource for SAEs across the semester. The AET *Quizizz* were used to measure student knowledge of the data management program. Mean scores were compared across observations for each assessment as well as cumulatively (see Table 3).

Table 3

Actual Ability of Participants to Identify and Use Features within The AET (N = 42)

AET Quiz Components	Observation 1	Observation 2	Observation 3	MD
	M	M	M	
Record Book Terms	62.20	74.86	69.49	7.29
AET Icons	57.07	70.48	69.20	12.13
Financial Applications	55.80	57.19	59.10	3.30
Cumulative	57.40	65.93	65.02	7.62

Note. Quiz scores ranged from 0 to 100.

Regarding Observation 1, students had a cumulative score of 57.40 (see Table 3). Regarding the quiz components, they scored a 62.20 on the Record Book Terms, a 57.07 on AET Icons, and a 55.80 on Financial Applications.

During Observation 2, students increased their cumulative score to a 65.93 (see Table 3). Regarding the quiz components, they scored a 74.86 on the Record Book Terms, a 70.48 on the AET Icons, and a 57.19 on the Financial Applications.

During Observation 3, students had a cumulative score of 65.02 (see Table 3). Regarding the quiz components, they scored a 69.49 on the Record Book Terms, a 69.20 on the AET Icons, and a 59.10 on the Financial Applications.

Students' actual knowledge of The AET Icons, Financial Applications, and Record Book Terms increased between Observations 1 and 2, with Record Book Terms and AET Icons both increasing by more than ten percent. However, during Observation 3, Record Book Terms and AET Icons exhibited a decrease in students' actual ability to recall terms and identify icons. Although slight, actual ability to determine correct Financial Applications increased throughout all three observations. Cumulatively, students' actual ability to use The AET increased from Observation 1 to Observation 2, and then slightly decreased when evaluated in Observation 3. The greatest growth of The AET Quiz Components from Week 1 to Week 16 was realized for AET Icons ($MD = 12.13$). In comparison, Financial Applications experienced the least amount of change ($MD = 3.30$) in students' actual ability throughout the semester-long course experience.

Conclusions

Roughly one-half of the students began their undergraduate education at OSU. Three (7%) students were not FFA members in high school. What is more, 21% of the students failed to receive their State FFA Degree, and only 17% had been a finalist for a State FFA Proficiency Award. Therefore, it is possible that a high number of students failed to have adequate experience with The AET prior to this course. As such, it might be unfair to expect these students obtain mastery (Bandura, 1994) in The AET as a result of one class. Additionally, this lack of experience in the use of The AET could have an impact on pedagogical content knowledge specifically (Rice & Kitchel, 2015).

Students' self-perceived abilities to use The AET increased across all areas throughout the semester, which supports Bandura's (1977) assertion that self-efficacy is solidified through rich experiences of performing a particular task over time. Increases were detected across the semester in all 22 statements, indicating that the students improved their efficacy for using the software and advising student SAEs because of the course. The term Advising students in completing National Chapter Award applications was rated lowest in self-perceived ability by students in all three observations. However, it was also the statement that experienced the greatest amount of overall mean difference change throughout the semester.

Students' actual abilities also increased overall when compared across the three-point time series; however, the growth might not be sustained long term, as scores showed a decrease between observations two and three in comparison to those noted between observations one and two. It is possible that the results might be attributed to the timing of the presentation of content related to The AET. Specifically, aspects of The AET were emphasized heavily during the first one-half (eight weeks) of the semester, and then tapered off toward the end of the semester. The

more elevated scores detected from Observation 1 to Observation 2 may be due to the recency effect of the emphasis of The AET during that time frame.

Although students' actual ability to determine Financial Applications in The AET increased across the three observations, their mean scores were still below a 60%, indicating a failing grade. Unfortunately, students were only able to increase their overall knowledge of The AET by a total of eight and one-half points (a grade of D) from Week 1 to Week 16. Simply stated, participants are not proficient in the financial applications of The AET, which is concerning considering the importance of teaching financial literacy in the current climate (Totenhagen et al., 2015). These poor scores are also concerning as fewer states look to add economics and personal finance courses to their graduation requirements (CEE, 2022). These findings also support those of Aviles (2015) who found that the areas of financial applications were areas where many struggled when utilizing the tools of The AET.

Recommendations

The study was limited to the delivery of The AET content and generalizability of its results. An assumption was made that the same content and activities featuring The AET would be taught and implemented each week by the three teaching assistants charged with delivering content to their respective laboratories. Although weekly meetings were held throughout the semester to attempt to maintain fidelity and consistency of such, differences in teaching assistants' personalities, teaching styles, and experiences using The AET as former SBAE teachers themselves undoubtedly existed and could have impacted the study's findings. Therefore, we acknowledge the results of the study could be limited by these factors.

What is more, the study included a convenient sample of students enrolled in a required teacher preparation course offered at the junior level at one institution. Therefore, the results cannot be generalized to all pre-service SBAE teachers across the country; rather, they are only representative of the students within this class. As such, additional research on the self-efficacy and actual ability of preservice teachers to implement The AET is necessary with a larger population of preservice teachers. We recommend other preservice institutions replicate this study to determine if the findings hold true across other university settings. We also recommend that correlational studies ensue to assess students' abilities to effectively use The AET based on their involvement in FFA activities at the secondary level.

Regarding the content, students need additional experience with the statement: Advising students in completing National Chapter Award applications, as students consistently rated it as the lowest mean value in each of the three observations. Perhaps the reason for this poor rating is due to the fact that students do not have the opportunity to advise students in the course currently. It is recommended that students be paired with actual students by a mentor teacher in SBAE programs so that they can experience a richer connection to The AET and obtain real-world experience with advising students who are working on award applications as part of their SAE program. Providing dedicated time for the students in this course to interact with FFA members in The AET would likely increase the readiness to learn and would provide concrete experiences for students to learn the content while using actual student data and working with a mentor teacher.

Further, it is important to determine the impact of this preparation on students as they enter the teaching profession. Are they better prepared for integrating The AET into their classrooms and FFA programs having learned about and used it for multiple weeks as part of their preservice preparation? Or, is *readiness to learn the criterion* absent or minimized during this phase of their preparation? Regardless, The AET should be a point of emphasis during the student teaching internship and again, as professional development, after students have accepted positions during their first year of teaching. Conducting a longitudinal trend study would provide comparisons between perceived and actual self-efficacy of teachers based on actual projects and experiences of their students and their readiness to learn such content. Finally, regarding teaching styles of graduate teaching assistants, a quasi-experimental study should be conducted in which different pedagogies are used to instruct students in the use of The AET. A comparison of such across different laboratory settings could aid in identifying the most effective method of instruction for teaching students about the importance of using The AET and how to do so most effectively.

Discussion

The most ideal ways of teaching young people to become financially independent, literate, and to make good investment decisions is an important topic that should continue to be discussed and considered by SBAE teachers. The current study provides additional insight into the practice of preparing SBAE teachers. The timing of when to teach certain topics to students is an imperative task for all teacher preparation programs. Perhaps students simply are not ready to learn aspects of The AET during the spring semester of their junior year. Based on the findings of this study, it is imperative that we, as a teacher preparation program, implement aspects of The AET into other pre-service courses, where appropriate, to provide students additional opportunities and iterations necessary for mastery experiences (Bandura, 1994). In addition, regarding the practice of teaching SBAE, the state office of career and technical education in Oklahoma should be alerted to the actual competency and self-efficacy levels of the new teachers in the state so that appropriate professional development may be provided once these students enter the teaching ranks. Finally, it is entirely possible that students overestimate their abilities to perform certain tasks (Woolfolk Hoy & Spero, 2005), especially when interfacing with that content over the course of a semester. Therefore, it is necessary that continued follow-up training and support exist to ensure that perceived self-efficacy eventually leads to actual competence.

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Suicide and School-based Agricultural Education in the Southern Region – A Multistate Exploratory Study

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Abstract

This study explored suicide exposure, awareness of warning signs and farm stressors, and related professional development (PD) experiences of school-based agricultural education (SBAE) teachers (N = 793) in the southern region of the United States. Most professional exposure to suicide involved students in a teacher's school, but not in their class; most personal exposure to suicide involved acquaintances. SBAE teachers recognized most warning signs and farm stressors; however, females, teachers who were more exposed to suicide in the professional setting, and teachers who were more aware of farm stressors were more likely to be aware warning signs. SBAE teachers recognized most farm stressors; however, teachers from urban areas, teachers who were more exposed to suicide in the personal setting, and teachers who were more aware of warning signs were more likely to be aware of farm stressors. Most SBAE teachers had attended suicide-related PD. While most who had not attended suicide-related PD indicated they were willing to attend, females, teachers with less teaching experience, teachers who were not previously offered PD, and teachers who were more exposed to suicide in the personal setting were more willing to attend.

Introduction and Theoretical Framework

The World Health Organization (WHO, 2021) reported that global instances of suicide were the fourth leading cause of death for those 15-29 years old in 2019 (Arensman et al., 2020). Domestically, suicide was the second leading cause of death in ages 10-34 between the years of 2000 to 2020 (Garnett et al., 2022). Agricultural professionals, including school-based agricultural education (SBAE) teachers, in the United States are not exempt from this crisis. A Centers for Disease Control (CDC, 2016) report detailed rates of suicide in the agricultural community at twice that of the general population (Curtin et al., 2016). This report followed a 2014 meta-review (Hirsch & Cukrowicz, 2014) which found that rural suicide rates were much

higher than urban areas. Explanations for these findings relate to: (a) the nature of rural geography where isolation from people and lack of access to services permits unchecked and unmonitored warning signs to persist over time; (b) external pressures related to the economy and environment that devastate a person's feelings of control and ability to overcome; and (c) the sociocultural sanctioned pressure to remain as stoic, steadfast, and dependable providers (Hirsch & Cukrowicz, 2014).

Domestically, one in five (Cuthbertson et al., 2022) adults associated with agriculture work are subject to and suffer from mental disease and suicidal iterations. The perceptions of suicide have historically been viewed through the lenses of ignorance, prejudice, and discrimination (Nathan & Nathan, 2020). Long held stereotypes of suicide according to Nathan and Nathan (2020) reflect societies judgment of individuals demonstrating "emotional weakness, attention seeking, selfishness, malingering, and immorality" (p. 2). Hesitation and fear of judgment were often responsible for untold tragedies that with appropriate professional interventions and education could have been mitigated. The stigma of mental health and suicide has been detrimental to the common good. In recent years, the increased understanding and awareness of comprehensive mental health programs have diminished the negative connotations associated with psychological maladies (WHO, 2022). These insights into a more progressive response to mental health and suicide have removed the negative association between the individual and public perceptions of their struggles.

Browning et al. (2008) examined suicides among farmers in three southeastern states during the period of 1990 to 1998; results confirmed an increased suicide mortality rate among white male farmers compared to the total white male population in these three states. Further, the increased rate of suicide was especially high among those aged 25-34 years, 75-84 years, and 85 years and older; male farmers in the 75-84 age group were twice as likely to die from suicide compared to the total white male population (Browning et al., 2008). In a systematic literature review about depressive symptoms and suicide among U.S. primary farmers and family members, Reed and Claunch (2020) identified the need for more robust science where suicide is the primary focus of the study and for intervention studies grounded in science, given the limited number of studies they discovered.

Previous research has primarily focused on farmers and farm families; only one prior study (Comer & Layfield, 2020) involved agricultural education teachers. In rural communities, SBAE teachers build relationships with agriculture students, their families, and members of the community, leaving them well positioned to recognize and respond to suicide ideation. However, while the SBAE profession commonly participates in various professional development (PD) encompassing a myriad of topics, suicide-related training has historically been ignored. The Jason Flatt Act addressed suicide prevention and PD training for educators in response to the epidemic of student mental health and suicide (Navigate360, 2022). The Tennessee General Assembly was the first legislative body to pass the Jason Flatt Act in 2007 (Jason Foundation, 2015), mandating two hours of PD. While most states recommend some kind of suicide training for K-12 teachers, staff, and administration, only 14 states require annual suicide prevention

training, another 22 states mandate training but do not specify it happen annually, and another 12 states encourage but do not require training (Navigate360, 2022).

Lazenby (2006) reported 10,000 educators personally and professionally experienced the emotional outcomes of student death including suicide. However, in a pilot study of SBAE teachers in South Carolina, a state that does mandate a one-time training (Navigate360, 2022), only 51% had participated in suicide-related PD, while 73% indicated a willingness to attend (Comer & Layfield, 2020). Comer and Layfield (2020) recommended replicating the study throughout the southern region of the United States after revising the instrument. Therefore, following this recommendation, this study utilized a revised instrument to examine SBAE teachers across that geographic region.

This study was grounded in Interpersonal Theory of Suicidal Behavior (Van Orden et al., 2010). According to the theory, the most dangerous form of suicidal desire is caused by the simultaneous presence of thwarted belongingness and perceived burdensomeness, and the capability to engage in suicidal behavior is separate from the desire. The model in Figure 1 shows a small area of overlap in the Venn diagram representing the minority of individuals who possess desire and capability for suicide. According to the theory, interventions that address perceived burdensomeness and thwarted belongingness should produce the best outcomes, while prevention efforts targeting thwarted belongingness and perceived burdensomeness may be effective. Being aware of conditions that could lead to a desire for suicide is crucial to recognizing warning signs. In agriculture, there are unique stressful circumstances that do not cause stress in other industries. Similarly, agricultural workers often have increased access to lethal means, rendering them more capable of suicide. For agricultural educators to receive impactful training related to suicide, PD should target the most critical needs of teachers based on prior knowledge and awareness.

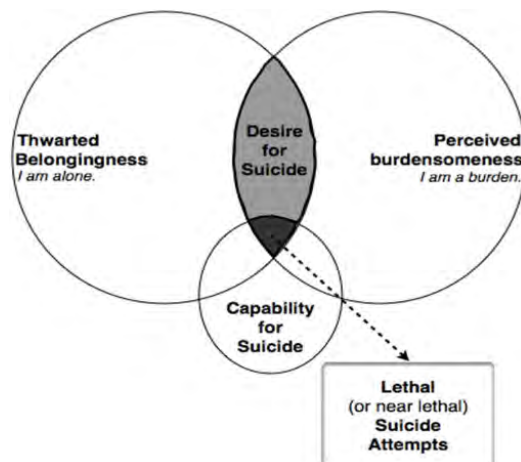


Figure 1. Interpersonal Theory of Suicidal Behavior (Van Orden et al., 2010).

Purpose and Research Questions

The purpose of this regional, multi-state study was to explore suicide exposure, awareness of suicide warning signs and farm stressors, and suicide-related PD experiences of

SBAE teachers in the southern region of the United States, as defined by the United States Department of Agriculture (USDA). The study was guided by the following research questions:

1. To what extent have SBAE teachers in the southern region of the United States, as defined by the USDA, been personally and professionally exposed to suicide?
2. How aware of suicide warning signs are SBAE teachers in the southern region of the United States, as defined by the USDA?
3. How aware of farm stressors are SBAE teachers in the southern region of the United States, as defined by the USDA?
4. What are the experiences regarding suicide-related PD of SBAE teachers in the southern region of the United States, as defined by the USDA?
5. Is teacher awareness of suicide warning signs associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of farm stressors, having attended suicide-related PD, and willingness to participate in suicide-related PD?
6. Is teacher awareness of farm stressors associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of suicide warning signs, having attended suicide-related PD, and willingness to participate in suicide-related PD?
7. Is the willingness to attend suicide PD associated with gender, age, ethnicity, education level, state, community, teaching experience, disability, being a farmer, interaction with farmers, interaction with agricultural workers, professional suicide exposure, personal suicide exposure, PD being offered, and having attended PD?

Methods

The population for this study were SBAE teachers in the southern region of the United States as defined by USDA-NIFA. A researcher-designed survey collected self-reported demographic data, exposure to suicide attempts and death by suicide according to professional and personal relationships, suicide-related PD experiences, and awareness of suicide warning signs and farm stressors. The Likert-type scale for awareness of warning signs and farm stressors replicated the scale used by Comer and Layfield (2020).

Content validity were achieved using a panel of experts in agricultural education ($N = 14$) representing higher education faculty ($n = 11$), supervisors of agricultural education ($n = 1$), a higher education department chair ($n = 1$), and a higher education assistant dean ($n = 1$) who reviewed for wording and readability ($n = 14$). Face validity was achieved through cognitive interviews conducted with SBAE teachers ($n = 5$) to determine understanding of questions and items; this process is used to improve instrument design as well as validity and reliability (Knafl et al., 2007). Feedback from experts and cognitive interviews led to reordering and rephrasing some items and questions. The instrument was pilot tested, yielding a Cronbach's alpha reliability coefficient of .87 for the suicide warning signs scale and .88 for the farm stressors scale. The Cronbach's alpha reliability coefficients on the final scale were .86 for awareness of suicide warning signs and .89 for awareness of farm stressors. Missing data were treated using

scale mean substitution, which is when the mean of all items in a scale is used to replace a missing item (Sabel-Soteres, 2004).

This study employed a census sampling approach, in which researchers attempt to survey all members of a population (Lodico et al., 2006). The census approach was chosen considering the multi-state nature of the study. Because each participating state or territory shares or safeguards SBAE teacher contact information differently, which introduced a barrier to random sampling, the researchers deemed the census approach necessary for successful execution of the project (Cooper & Schindler, 2003). When the census sampling approach is used, there is an absence of sampling error (Arnab, 2017); however, the researchers acknowledge findings are not generalizable to other populations which is a limitation of this study.

Utilizing the most accessible email listserv in each state and territory was identified as the most consistent approach for contacting the population. An introductory email was sent to the population describing the upcoming study and asking teachers to consider participating. One week later, a follow-up email was sent with an invitation to participate and a link to the survey housed on Qualtrics software, Version 2022. Three subsequent reminder emails were sent at one-week intervals for a total of four invitations. Before accessing the informed consent, potential participants were asked two screening questions: (a) do you sometimes feel depressed to the extent you have contemplated suicide; and (b) do you sometimes feel isolated from others to the extent you have contemplated suicide. If answered “yes”, potential participants were directed to online mental health resources and not allowed to participate. Using National Association of Agricultural Educators’ (n.d.) 2021 state-level agricultural education supply and demand profiles, the researchers estimate the total population of SBAE teachers from states and territories involved in this study to be 6,961. Of the total number of attempted respondents ($n = 1,155$), 21% ($n = 247$) were filtered out for suicidal ideation. Additionally, 95 did not consent to participation and of the 813 submitted responses, 20 were removed from analysis due to incompleteness. Therefore, the researchers estimate the usable response rate was 11% ($n = 793$). The researchers acknowledge utilizing email listservs is a limitation of this study, as this approach can open participation to recipients who are no longer part of the population due to the timeliness of updating listserv members, varying requirements for inclusion on a listserv, and other factors.

Because nonresponse error can be a threat to external validity, an independent-samples *t*-test was conducted to compare awareness of suicide warning signs in early respondents and late respondents. Late respondents were those who responded to the instrument during the last wave of data collection as suggested by Lindner et al. (2001). There was not a significant difference in the scores for early respondents ($M = 32.67$, $SD = 4.04$) and late respondents ($M = 31.92$, $SD = 5.67$); $t(66) = 1.02$, $p = .31$. An independent-samples *t*-test was conducted to compare awareness of farm stressors in early respondents and late respondents. There was not a significant difference in the scores for early respondents ($M = 44.35$, $SD = 6.44$) and late respondents ($M = 43.44$, $SD = 7.36$); $t(69) = 0.94$, $p = .35$. Given the absence of significant differences, results can be generalized to the population under investigation (Lindner et al., 2001).

Participant Characteristics

Demographic data were collected to describe participant characteristics regarding gender, age, ethnicity, disability, state, community, education level, teaching experience, being a farmer or not, and frequency of interaction with farmers and agricultural workers. Regarding gender, 55.23% ($n = 438$) identified as woman, 44.39% ($n = 352$) identified as man, 0.25% ($n = 2$) identified as gender nonconforming, and 0.13% ($n = 1$) identified as transgender woman. Regarding age, 13.87% ($n = 110$) were between the ages of 21 and 25, 32.53% ($n = 258$) were between the ages of 26 and 35, 25.60% ($n = 203$) were between the ages of 36 and 45, 18.03% ($n = 143$) were between the ages of 46 and 55, 8.70% ($n = 69$) were between the ages of 56 and 65, 1.13% ($n = 9$) were between the ages of 66 and 75, and 0.13% ($n = 1$) preferred to not answer. Regarding ethnicity, 78.89% ($n = 697$) were white, 11.23% ($n = 89$) were nonwhite, and .88% ($n = 7$) preferred to not answer. Regarding disability, 7.69% ($n = 61$) reported having a disability, 91.68% ($n = 727$) reported not having a disability, and 0.63% ($n = 5$) preferred to not answer.

Regarding state where teaching, 0.50% ($n = 4$) were from Alabama, 6.05% ($n = 48$) were from Arkansas, 5.55% ($n = 44$) were from Florida, 7.82% ($n = 62$) were from Georgia, 7.94% ($n = 63$) were from Kentucky, 4.67% ($n = 37$) were from Louisiana, 2.90% ($n = 23$) were from Mississippi, 13.49% ($n = 107$) were from North Carolina, 12.99% ($n = 103$) were from Oklahoma, 1.77% ($n = 14$) were from Puerto Rico, 4.54% ($n = 36$) were from South Carolina, 7.06% ($n = 56$) were from Tennessee, 16.8% ($n = 135$) were from Texas, 0.38% ($n = 3$) were from the U. S. Virgin Islands, and 3.15% ($n = 25$) were from Virginia. Regarding community where teaching, 69.8% ($n = 554$) were in a rural location, 21.44% ($n = 170$) were in a suburban location, and 8.70% ($n = 69$) were in an urban location.

Regarding education level, 49.05% ($n = 389$) held a master's degree or higher, while 50.95% ($n = 404$) held a bachelor's degree or lower. Regarding years of teaching experience, 29.76% ($n = 236$) had between 1 and 5 years, 25.22% ($n = 200$) had between 6 and 10 years, 13.37% ($n = 106$) had between 11 and 15 years, 11.10% ($n = 88$) had between 16 and 20 years, 9.96% ($n = 79$) had between 21 and 25 years, 6.05% ($n = 48$) had between 26 and 30 years, and 4.54% ($n = 36$) had 31 or more years of experience.

Regarding being a farmer or not, 50.19% ($n = 398$) did not identify as a farmer, 49.18% ($n = 390$) did identify as farmer, and 0.63% ($n = 5$) preferred to not answer. Regarding frequency of interaction with farmers, 2.02% ($n = 16$) never interacted with farmers, 35.69% ($n = 283$) interacted with farmers daily, 32.28% ($n = 256$) interacted with farmers weekly, 22.07% ($n = 175$) interacted with farmers monthly, 5.30% ($n = 42$) interacted with farmers every six months, 1.77% ($n = 14$) interacted with farmers yearly, and 0.88% ($n = 7$) interacted with farmers at a frequency not listed in the survey. Regarding frequency of interaction with farm workers, 1.89% ($n = 15$) never interacted with farm workers, 43.63% ($n = 346$) interacted with farm workers daily, 33.67% ($n = 267$) interacted with farm workers weekly, 15.01% ($n = 119$) interacted with farm workers monthly, 4.41% ($n = 35$) interacted with farm workers every six months, 1.13% ($n = 9$) interacted with farm workers yearly, and 0.25% ($n = 2$) interacted with farm workers at a frequency not listed on the survey.

Results and Findings

Research question one asked to what extent SBAE teachers in the southern region of the United States had, as defined by the USDA, been professionally (see Table 1) and personally (see Table 2) exposed to suicide. Data were analyzed using descriptive statistics. The grand mean score for professional exposure to suicide attempts was 0.53 ($SD = 0.58$); for professional exposure to death by suicide, the grand mean was 0.19 ($SD = 0.20$). Most professional exposure to suicide attempts and death by suicide involved students in a teacher's school, but not in their class with a mean of 1.66 ($SD = 4.45$) and 0.56 ($SD = 1.27$), respectively. The grand mean score for personal exposure to suicide attempts was 0.26 ($SD = 0.25$); for personal exposure to death by suicide, the grand mean was 0.17 ($SD = 0.17$). Most personal exposure to suicide attempts and death by suicide involved acquaintances with a mean of 0.75 ($SD = 1.32$) and 0.50 ($SD = 0.95$), respectively.

Table 1.
Professional exposure to suicide

Professional Relationship	Attempted		Died By	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Student within your class	0.91	2.36	0.17	0.51
Former student	0.92	1.88	0.42	0.79
Student within your school, but not your class	1.66	4.45	0.56	1.27
Teacher in your school	0.10	0.38	0.06	0.27
Administrator in your school	0.01	0.12	0.01	0.11
Staff member in your school	0.05	0.31	0.01	0.12
Teacher in your professional organization	0.19	0.64	0.11	0.39
Other	0.40	1.74	0.19	0.82
Grand Mean	0.53	0.58	0.19	0.20

Table 2.
Personal exposure to suicide

Personal Relationship	Attempted		Died By	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Friend	0.54	1.06	0.34	0.87
Acquaintance	0.75	1.32	0.50	0.95
Family friend	0.35	0.75	0.23	0.62
Relative of a friend	0.41	0.87	0.28	0.67
Parent	0.04	0.19	0.01	0.11
Grandparent	0.05	0.23	0.03	0.18
Sibling	0.05	0.24	0.01	0.08
Romantic partner	0.04	0.19	0.01	0.09
Extended family member	0.31	0.78	0.22	0.56
Other	0.08	0.38	0.06	0.47
Grand Mean	0.26	0.25	0.17	0.17

Research question two asked how aware of suicide warning signs were SBAE teachers in the southern region of the United States, as defined by the USDA. Data were analyzed using

descriptive statistics, shown in descending order, and are summarized in Table 3. On a 3-point Likert-type scale (1 = not a warning sign; 2 = may be a warning sign; 3 = definitely a warning sign), the grand mean score for awareness of suicide warning signs was 2.51 ($SD = 2.04$); on average, SBAE teachers recognized most suicide warning signs.

Table 3.
Awareness of Suicide Warning Signs

Warning Signs	<i>M</i>	<i>SD</i>
No reason for living; no sense of purpose in life	2.90	0.31
Feeling trapped—like there’s no way out	2.83	0.39
Withdrawing from friends, family, or society	2.82	0.41
Hopelessness	2.69	0.49
Increasing alcohol or drug use	2.69	0.50
Getting plans in order for the end of life	2.61	0.55
Dramatic changes in mood	2.50	0.55
Acting reckless	2.49	0.58
Anxiety, agitation, unable to sleep	2.39	0.57
Engaging in risky activities	2.38	0.57
Sleeping all the time	2.28	0.60
Rage, anger, seeking revenge	2.26	0.62
Seasonal variations in workload	1.76	0.63
Grand Mean	2.51	2.04

Research question three asked how aware of farm stressors were SBAE teachers in the southern region of the United States, as defined by the USDA. Data were analyzed using descriptive statistics, shown in descending order, and are summarized in Table 4. On a 3-point Likert-type scale (1 = not a farm stressor; 2 = may be a farm stressor; 3 = definitely a farm stressor), the grand mean score for awareness of farm stressors was 2.46 ($SD = 2.01$); on average, SBAE teachers recognized most farm stressors.

Table 4.
Awareness of Farm Stressors

Stressors	<i>M</i>	<i>SD</i>
High debt load	2.86	0.39
Immense debt load	2.86	0.39
Not enough money for day-to-day expenses	2.79	0.47
Not enough cash/capital for unexpected problems	2.76	0.46
Concern about the future of the farm	2.67	0.56
Demanding workload for one person	2.55	0.63
Time constraints for family	2.49	0.61
Health care costs	2.47	0.62
Financing for retirement	2.47	0.63
Poor health	2.47	0.61
Taxes	2.44	0.62
Government regulations or restrictions	2.34	0.68

Lack of personal support	2.32	0.65
Not enough funding for improvements or technological advancements	2.30	0.68
Lack of support group	2.17	0.70
Lack of support groups/systems	2.17	0.68
Seasonal changes in workload	2.12	0.71
Being physically isolated from neighbors or the community	2.04	0.73
Grand Mean	2.46	2.01

Research question four asked what the experiences regarding suicide-related PD of SBAE teachers in the southern region of the United States were, as defined by the USDA. Data were analyzed using descriptive statistics (see Table 5). Regarding being offered, 33.29% ($n = 264$) reported PD was not offered, 51.32% ($n = 407$) reported PD was offered, and 15.38% ($n = 122$) were unsure; on average, most SBAE teachers have been offered and have attended suicide-related PD. Regarding attending, 48.42% ($n = 384$) had not attended, while 51.58% ($n = 409$) had attended PD. For those who had not attended, 22.92% ($n = 88$) indicated they were not willing to attend PD if it were offered, while 76.56 ($n = 294$) indicated they would, and 0.52% ($n = 2$) preferred to not answer.

Table 5.
Suicide-related Professional Development Experiences

		<i>n</i>	%
Offered	No	264	33.29
	Yes	407	51.32
	Unsure	122	15.38
Attended	No	384	48.42
	Yes	409	51.58
Willing to attend ^a	No	88	22.92
	Yes	294	76.56
	Prefer to not answer	2	0.52

Note. ^aOnly those who indicated they had not attended suicide-related professional development were asked to indicate if they would be willing to attend if that type of professional development was offered.

Research question five asked if teacher awareness of suicide warning signs was associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of farm stressors, having attended suicide-related PD, and willingness to participate in suicide-related PD. A multiple regression model was fitted to the data with teacher awareness of suicide warning signs as the dependent variable and the other variables as the independent variables. Gender was significantly associated with awareness of suicide warning signs ($b=-1.12, p<0.05$) after controlling for the other independent variables, indicating that females are more aware of the suicide warning signs than males. Suicide exposure in the professional setting was significantly and positively associated with the awareness of suicide warning signs ($b=0.04, p<0.05$) after controlling for the

other independent variables, indicating that teachers who were more exposed to suicide in the professional settings are more likely to be aware of suicide warning signs than teachers who were less exposed. Awareness of farm stressors is significantly and positively associated with the awareness of suicide warning signs ($b=0.30, p<0.05$) after controlling for the other independent variables, indicating that teachers who were more aware of farm stressors are more likely to be aware of suicide warning signs than teachers who were less aware of farm stressors. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the three significant independent variables included). The root mean square error (RMSE) for the full model was 3.54 with an R^2 of 28.74%, and the RMSE for the reduced model is 3.52 with an R^2 of 28.67%, indicating that the optimal model for the first research question was to retain the three significant independent variables, and 28.67% of the variance in awareness of suicide warning signs is explained by gender, suicide exposure in the professional setting, and the awareness of farm stressors.

Research question six asked if teacher awareness of farm stressors was associated with gender, age, ethnicity, education, state, community, teaching experience, disability, being a farmer or not, frequency of interaction with farmers and agricultural workers, professional suicide exposure, personal suicide exposure, awareness of suicide warning signs, having attended suicide-related PD, and willingness to participate in suicide-related PD. A multiple regression model was fitted to the data with teacher awareness of farm stressors as the dependent variable and the other variables as the independent variables. Community was significantly associated with awareness of farm stressors ($b=2.08, p<0.05$) after controlling for the other independent variables, indicating that teachers from urban areas are more aware of farm stressors than teachers from rural areas. Suicide exposure in the personal setting was significantly and positively associated with the awareness of farm stressors ($b=0.10, p<0.05$) after controlling for the other independent variables, indicating that teachers who were more exposed to suicide in the personal setting are more likely to be aware of farm stressors than teachers who were less exposed to suicide in a personal setting. Awareness of suicide warning signs was significantly and positively associated with the awareness of farm stressors ($b=0.76, p<0.05$) after controlling for the other independent variables, indicating that teachers who were more aware of suicide warning signs are more likely to be aware of farm stressors than teachers who were less aware of suicide warning signs. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the three significant independent variables included). The root mean square error (RMSE) for the full model is 5.63 with an R^2 of 26.54%, and the RMSE for the reduced model is 5.60 with an R^2 of 26.31%, indicating that the optimal model for the second research question was to retain the three significant independent variables, and 26.31% of the variance in awareness of farm stressors is explained by the community, suicide exposure in the personal setting, and awareness of suicide warning signs.

Research question seven asked if the willingness to attend suicide PD was associated with gender, age, ethnicity, education level, state, community, teaching experience, disability, being a farmer, interaction with farmers, interaction with agricultural workers, professional

suicide exposure, personal suicide exposure, PD being offered, and having attended PD. A logistic regression model was fitted to the data with the willingness to attend suicide PD as the dependent variable and the other variables as the independent variables. Gender was significantly associated with the willingness to attend the suicide PD ($OR = 2.55, p < 0.05$) after controlling for the other independent variables, indicating that females were 2.55 times more willing to attend the suicide PD than males. Teaching experience was significantly associated with the willingness to attend the suicide PD ($OR = 1.36, p < 0.05$) after controlling for the other independent variables, indicating that teachers with less teaching experience were more willing to attend the suicide PD than teachers with more teaching experience. Suicide PD being offered was significantly associated with the willingness to attend the suicide PD ($OR = 2.07, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were not offered PD were 2.07 times more willing to attend the suicide PD than teachers who were not sure if they were offered PD or not. Suicide exposure in the personal setting was significantly associated with the willingness to attend the suicide PD ($OR = 1.09, p < 0.05$) after controlling for the other independent variables, indicating that teachers who were more exposed to suicide in the personal setting were more willing to attend the suicide PD than teachers who were less exposed to suicide in the personal setting. Ten-fold cross-validation was performed to compare the full model (i.e., with all the independent variables included) and the reduced model (i.e., with the four significant independent variables included). The classification accuracy for the full model is 74.44%, and the classification accuracy for the reduced model is 78.24%, indicating that the optimal model for the third research question was to retain the four significant independent variables: gender, teaching experience, suicide PD being offered, and suicide exposure in the personal setting.

Conclusions, Recommendations, and Implications

Based upon the results of this study, the researchers concluded that SBAE teachers recognized most warning signs and farm stressors; however, females, teachers who were more exposed to suicide in the professional setting, and teachers who were more aware of farm stressors were more likely to be aware warning signs. Findings from this study highlighted the need for agricultural educators to be aware of farm stressors (i.e., high debt load, concern about the future of the farm, lack of support groups/systems, etc.), as they are significantly and positively associated with the awareness of suicide warning signs (e.g., no reason for living; no sense of purpose in life, feeling trapped – like there’s no way out, hopelessness, etc.).

The researchers further concluded that SBAE teachers recognized most farm stressors; however, teachers from urban areas, teachers who were more exposed to suicide in the personal setting, and teachers who were more aware of warning signs were more likely to be aware of farm stressors. White male farmers have an increased suicide mortality rate compared to the total white population (Browning et al., 2008). Since awareness of farm stressors is significantly and positively associated with awareness of suicide warning signs, PD offerings could be a catalyst to the awareness of conditions that could lead to a desire for suicide (Van Orden et al., 2010).

Additionally, the researchers concluded that most SBAE teachers had attended suicide-related PD. While most who had not attended suicide-related PD indicated they were willing to

attend, females, teachers with less teaching experience, teachers who were not previously offered PD, and teachers who were more exposed to suicide in the personal setting were more willing to attend. While SBAE teachers recognized most suicide warning signs, suicide-related PD offerings for agricultural educators should be robust. Prevention efforts targeting thwarted belongingness and perceived burdensomeness may be effective, while interventions that address these feelings should produce the best outcomes (Van Orden et al., 2010). Training SBAE teachers on farm stressors and suicide could better equip them to recognize warning signs and intervene; however, Comer and Layfield (2020) discovered only 51% had participated in suicide-related PD, while 73% were willing to attend. Data were closely aligned in the current study, where 52% had participated and 77% were willing. Interestingly, more teachers had participated in suicide-related PD than those who reported training being offered in their school system, signaling that SBAE teachers seek PD opportunities outside their place of employment.

Given SBAE program's role in communities, further research should explore potential reasons agricultural educators choose to not engage in suicide-related PD experiences. While 36 states require some form of suicide training (Navigate360, 2022), providing a certification or credential could be a potential incentive for teachers completing suicide prevention training in states that do not mandate annual training. While age was not a significant factor in determining whether a teacher would participate in suicide-related PD, years of teaching experience was. Therefore, suicide-related PD should be delivered in a tiered model, such that training is tailored to the teacher's years of classroom experience. Additionally, SBAE teachers with more personal exposure to suicide should deliver the PD to build rapport with peers and combat negative stigma associated with mental illness as well as potential feelings of thwarted belongingness among participants.

Therefore, the researchers recommend future studies about SBAE teachers and suicide investigate the following:

1. Examine how additional demographics beyond those explored in this study, such as sexual orientation and religious beliefs, may affect awareness of suicide warning signs;
2. Examine mental health as a larger construct in SBAE with regard to attitudes, awareness of resources, and self-care;
3. Examine SBAE teacher attitudes regarding suicide;
4. Examine how SBAE teachers who have contemplated suicide cope during the time of crisis;
5. Examine factors of SBAE teachers who have contemplated suicide that contributed to feelings of thwarted belongingness and perceived burdensome; and
6. Examine the preferred PD delivery method of SBAE teachers regarding suicide.

Finally, we recommend suicide-related PD be offered where agriculture teachers convene. This will only happen when those responsible for selecting and organizing PD are supportive. Therefore, results of this study should be shared with decision makers, including members of the National Association of Supervisors of Agricultural Education, National FFA Organization staff, leadership (state, regional, and national) of the National Association of Agricultural Educators, and members of the American Association for Agricultural Education, who can build the necessary PD into existing programming efforts.

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An Evaluation of U.S. Egg Industry Experts' Perceptions of Alternative Housing Environments: Implications for the Marketing and Communication of Egg Products

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Abstract

Food labeling in the U.S. has become increasingly complex for consumers. For example, today's consumers demand transparency and accurate labeling of niche eggs. In response, the current investigation examined experts' perceptions of the strength, weaknesses, opportunities, and threats (SWOT) of producers raising laying hens for niche markets, e.g., cage-free, free-range, organic, and pasture-raised egg production. By combining a modified Delphi approach and SWOT analysis as a decision-making framework, 74.71% of the items reached a consensus. As a result, we recommended that industry professionals and agricultural communicators create consumer education strategies designed to address consumer distrust. Further, future research should prioritize data collection that better leverages the communication of egg products to educate consumers about various product differentiation tactics used in the poultry egg industry. Finally, we recommend that egg companies collaborate with agricultural communicators to create a formal strategy to ensure that egg producers across various production approaches can tell the story of their products to consumers effectively.

Introduction and Review of Literature

Many consumers and industry professionals have raised concerns about how laying hens have historically been housed and treated (Zhao et al., 2015). As such, the United States Department of Agriculture (USDA) created labeling guidelines that specify that “eggs labeled as cage-free or from free-roaming hens are laid by hens that are allowed to roam in a room or open area, which is typically a barn or poultry house” (USDA, 2018, para. 2). Additionally, the USDA explained that hens raised outdoors or that have access to outdoor areas should be considered free-range or pasture-fed (USDA, 2018). In contrast, some egg brands have opted out of traditional USDA production and labeling regulations and developed their own raising standards (Powers & Roberts, 2022). However, loosely defined and ambiguous definitions of cage-free and free-range hens have created a level of uncertainty among consumers regarding the ethics associated with various alternative housing options that have emerged in the poultry industry (Powers, 2020).

This issue has been further compounded by consumers' increased demand for choice in the egg industry, which has led to the development of an array of selections available in the retail egg market (Hisasaga et al., 2020). For example, grocery stores have begun to provide new egg products that champion alternative housing options such as cage-free, free-range, organic, and pasture-raised (Hisasaga et al., 2020). However, existing research has suggested that these niche

products lack standards concerning the housing environment in which they have been produced (Lusk, 2019). This trend has resulted in consumers' confusion because they struggle to differentiate among the various niche-market terms prevalent in the poultry industry (Lusk, 2019). Despite this, demand for these niche markets has increased in recent years (Hisasaga et al., 2020). For example, recent evidence has indicated that consumers prefer eggs sourced from alternative housing systems (Heng et al., 2013; Lusk, 2019). However, they also reported a reluctance to pay a premium for specialty eggs (Powers et al., 2020). Nevertheless, specialty and designer eggs have been promoted by many brands' marketing campaigns (Hisasaga et al., 2020). Case in point, Pete and Gerry's, Vital Farms, and Organic Valley are all brands that have provided consumers with eggs raised in alternative housing environments in response to the rise in demand for niche products, which has been viewed as a strategic branding device (Powers & Roberts, 2022). Consequently, it was critical to examine how poultry producers have used food labels to brand their products effectively.

Labels often represent a brand. However, it was not until the 1990s that food branding became popular (Moor, 2007). Since the term's rise, it has been difficult to define branding because of the different meanings and contexts associated with its use. Nevertheless, Moor (2007) suggested that branding could be described "...differently in... different contexts, where it makes use of different forms of representation, different techniques and technologies, and different kinds of relationships for different kinds of strategic purpose[s]" (p. 7). Therefore, brands serve as informational tools and provide clear signals to consumers (Loken et al., 2010). According to Moor (2007), brands also make possible a repetition of information, which can help consumers organize experiences and perceptions strategically. As a result, many brands have begun to monitor consumer activity by embedding cultural values in their campaigns to target audiences' beliefs and behaviors (Moor, 2007). Previous research has explored how consumers view brands and use them to make decisions (Coelho et al., 2018; Hoeffler & Keller, 2003; Songa & Russo, 2018). For example, using a meta-analytic approach, Hoeffler and Keller (2003) described how modern food companies have demonstrated that effective branding can positively influence consumers' association with their brands. Further, quality brands can positively influence consumers' attitudes regarding a company's image, reputation, and ethics (Hoeffler & Keller, 2003). On this point, Coelho et al. (2018) explained that quality brands should be designed to meet consumers' desire to express their values and morals (Coelho et al., 2018). This concept has been termed *brand personality* and refers to the social dynamics that connect products to the human experience (Martineau, 1958).

For instance, brand personality has been used extensively in the U.S. dairy industry. Although brands like Borden Dairy and Horizon Organic boast of their superior pasteurization, they also decorate their cartons with cartoon renderings of dairy cows (Borden Dairy, n.d.) As a result of this imagery, many consumers have reported that they have more trust in these brands because they perceive the product was naturally produced (Bergsten et al., 2015; Hernandez-Mendo et al., 2007). Consequently, brand personality has become critical for agricultural products (Llanos-Herrera, 2019). Perhaps this marketing tactic has been successful because many consumers have little to no exposure or interaction with livestock animals. As an illustration, it has been reported that 98% of the modern U.S. population has no direct contact with the agricultural industry (American Farm Bureau Federation, 2018). Therefore, members of the non-agriculture population base their opinions on past life experiences, such as farm tour experiences, which has

not allowed them to form an accurate perception of the industry (Duncan & Broyles, 2006). Consumers have reported they gain trust in agricultural products when imagery such as red barns, horse-drawn plows, and scenes of animals grazing on an open field has been used to market products (Bergsten et al., 2015). However, when agricultural companies use terms such as genetically modified, technology-enhanced, or fortified, consumers' skepticism has been shown to increase significantly (Llanos-Herrera, 2019).

To demonstrate how this concept has been ingrained in the U.S. cultural psyche, Specht and Rutherford (2016) used a pastoral lens to examine nine agrarian films. They concluded that between 1950 and 1980, the films often portrayed the industry as a "pastoral fantasy" (Specht & Rutherford, 2016, p. 13). They also found the images and ideas used in the films have led to the public's misperceptions of the agricultural industry (Specht & Rutherford, 2016). Consequently, this misunderstanding has likely hampered consumers' acceptance of modern, practical, and effective farm animal welfare practices (Specht & Rutherford, 2016). This issue appears to have been further exacerbated by the media's portrayal of farm animal welfare.

Ethical food production and purchasing decisions have been increasingly popular media topics since the early 2000s (Phillipov, 2017). As a result, depictions in the news, broadcast, and social media have become integral to food-related discourse and have acted as mediators for consumers by distributing accurate and misleading information in the public sphere (Coelho et al., 2018). Because transparency in food production has become increasingly important to consumers (Rumble & Irani, 2016), the agricultural industry must consider the opinions of consumers, and communicators have been forced to reexamine ways to communicate effectively with the public (Gellynck et al., 2006). Media coverage of animal welfare-related legislation, such as Proposition 2 in California, and undercover videos that reveal the mistreatment of farm animals set the tone for animal welfare and husbandry discussions (Lusk, 2019). One explanation for why such policies have gained acceptance was that the public had received more exposure to negative images and stories that showcase the inhumane treatment of animals associated with the food animal production processes, which has led to the public perception that such practices have become norms in the industry (Sweeney et al., 2022). Because of these issues, consumers have consistently expressed a desire to understand better how their food has been raised. In response, Tarpley et al. (2020) sought to examine the comfort of young adults while viewing videos of cattle and hog harvesting. The results of this study indicated that increased transparency regarding animal welfare and processes involving animal harvesting could lead to negative perceptions of common agricultural practices, especially regarding the farm animal industry (Tarpley et al., 2020). Consequently, graphic imagery may be met with great discomfort by the viewing audience (Tarpley et al., 2020). Therefore, it was critical to understand experts' perceptions of the perceived strengths, weaknesses, opportunities, and threats for egg producers to raise laying hens for niche markets.

Theoretical Framework

This investigation was guided by consensus-building theory (CBT) (Fischer & Ury, 1991). In many organizations and industries, a struggle to agree on basic standards has led to considerable confusion. This phenomenon has been termed idealization (Hoffmann, 2021). In some cases, idealizations can be necessary because many issues present a level of complexity that does not

allow practical nor “philosophically interesting” insights (Crowley et al., 2016, p. 353). Further, idealizations allow for fine-tuning and regulating discussions with differing perspectives (Feldman & Warfield, 2010). Reasoning and justifiable debates can positively contribute to real-world issues, but they have become vital to determine the relevance and importance of a disagreement for the greater good (Hoffmann, 2021). From there, idealizations become a point of rationale to achieve the ultimate goal of benefiting consumers. Nevertheless, the question has remained – can professionals in the poultry industry agree on the industry’s controversial issues?

Developed by Fischer and Ury (1991), there are four principles of consensus-building. The first is to “separate the people from the problem” (Fischer & Ury, 1991, p. 11). This concept has been rooted in real problems that have existed within conflicts. The root of a problem can be difficult to determine when individuals react to one another with robust emotions or skewed perceptions. The second principle is to “focus on interests, not positions” (Fischer & Ury, 1991, p. 11). This concept can be understood by the personal positions that individuals take when disagreeing. However, according to Fischer and Ury (1991), when building consensus, the focus should be on satisfying common interests rather than personal views. The third principle suggests that creativity and generating multiple options for potential agreement can help build consensus when facing diverse and opposing opinions. The final principle of building consensus is insisting that “the result be based on some objective standard” (Fischer & Ury, 1991, p. 11). This notion “can be countered by insisting that an outcome must reflect some fair standard independent of the naked will of either side...by discussing such criteria rather than what the parties are willing or unwilling to do, neither party need give in to the other; both can defer to a fair solution” (Fischer & Ury, 1991, pp. 11-12). It is important to note that all four principles involve developing participants’ perspective change on key issues.

Statement of Purpose

The purpose of this study was to examine experts’ perceptions of the strength, weaknesses, opportunities, and threats (SWOT) of producers raising laying hens for niche markets, e.g., cage-free, free-range, organic, and pasture-raised egg production. This study aligned with the American Association for Agricultural Education’s National Research Agenda Research Priority 1: *Public and Policy Maker Understanding of Agriculture and Natural Resources* (Enns et al., 2016). The public’s dearth of knowledge about agricultural products, such as eggs, has created issues regarding what they perceive as acceptable production practices (Enns et al., 2016). Consequently, this study had the potential to address a critical need. One objective guided this investigation: examine the perspectives of experts regarding hen welfare and commonly used terms and labels found of egg packaging using SWOT analysis as a decision-making framework.

Methodology

We conducted a modified Delphi for this study while also using a SWOT analysis approach to interpret the results. The Delphi approach has been commonly used as a method to forecast the level of uncertainty regarding a topic or problem in the absence of adequate data (Schmelzenbart et al., 2018). Delphi studies also allow researchers to examine the perspectives of experts to refine common responses through monitored feedback (Trevelyan & Robinson, 2015).

Since the early 1950s, industry professionals and researchers have used SWOT analyses successfully as planning tools (Panagiotou, 2003). The SWOT approach divides perspectives on an issue into categories of internal and external factors – with strengths and weaknesses reflecting internal factors and opportunities and threats representing external factors (Duarte et al., 2006; Valentin, 2001). The Delphi approach has previously been used in combination with a SWOT analysis framework (Hossain & Hossain, 2015; López, 2004; Rehmat et al., 2014; Schmelzenbart et al., 2018) to guide the collection, analysis, and interpretation of data. SWOT analyses have been used in various contexts and have been considered one of the most practical approaches to analyzing risks, forecasting fluctuating trends, and capturing perspectives on polarizing topics (Chernov et al., 2016; Párraga et al., 2014). Therefore, the SWOT analysis and Delphi method can be mutually beneficial when used simultaneously. In general, a SWOT analysis aids in decision-making, while the Delphi approach captures emergent views and their importance level when experts consider them. Therefore, when implementing a SWOT analysis and the Delphi approach, “evaluations of alternate strategic decisions and the positioning of items can be united and may deliver more robust, reliable, and valuable results” (Schmelzenbart et al., 2018, p. 75).

Delphi utilizes both qualitative and quantitative data; therefore, the approach to statistical analyses has primarily been measures of central tendency (Hasson et al., 2000). When determining decision rules for reaching a consensus, Hsu and Sandford (2007) suggested that the level of criteria was subject to interpretation. At the most basic level, reaching a consensus on an issue can be determined when a specific number of panelists fall within a certain range (Miller, 2006). For example, Ulschak (1983) recommended that consensus be based on rigorous decision rules in which 80% of panelist responses fall within two categories on a seven-point scale (Ulschak, 1983). In contrast, Green et al. (1990) was more liberal when he argued that researchers should only have 65% of panelists rate three or higher on a four-point Likert-type scale and garner a mean of at least 3.25. The decision rules for this study were determined by considering both rigorous and more flexible criteria. For example, we determined that at least 66% of panelists should respond to each item with either *Agree* or *Somewhat Agree* in round two to reach a *consensus of agreement*. Meanwhile, items falling within 50% to 65.9% were retained for reconsideration in round three. Further, items below 50% were discarded from the study.

Data were analyzed using Microsoft Office Excel® 2021. Nominal data, i.e., some demographic characteristics, were analyzed using frequencies and percentages. However, for the panelists’ ages and years of experience, ranges and averages were also calculated. For each item in rounds two and three, the frequency distribution validity percentage was used to determine if consensus had been reached, the item should be retained for further consideration, or removed from the study (Buriak & Shinn, 1989; Jenkins & Kitchel, 2009). We achieved this by presenting four open-ended questions. Therefore, the panelists were asked to explain their perspectives on egg producers’ strengths, weaknesses, opportunities, and threats to raising laying hens intended for niche markets by industry definitions for respective alternative housing operations.

As a result of the Delphi approach, in round two, 87 items were presented to the expert panel ($n = 12$; 100% response rate), for which more than two-thirds (>66.00%) of the participants selected either *Extremely Important* or *Slightly Important* were considered items that reached consensus (Buriak & Shinn, 1989; Hsu & Sandford, 2007). Additionally, items for which less

than one-half (50.00%) of the participants selected either *Extremely Important* or *Slightly Important* were removed from the study. Round three of the study included items presented by the expert panel for which more than one-half (>50.00%) but less than two-thirds (<66.00%) of the panelists selected *Extremely Important* or *Slightly Important* during round two. In round three, there were 14 items that were presented for reconsideration by the panelists ($n = 12$; 100% response rate). Ten items (64.28%) reached a consensus in the final round.

This study’s participants were identified using a combination of purposive and snowball sampling. For example, faculty at Louisiana State University first nominated individuals they considered experts in the poultry industry. The two initial faculty had more than 50 individual publications in peer-refereed journal articles on poultry production practices. Then, we asked the initial participants to nominate additional individuals who fit this investigation’s parameters for experts. This approach has been common for Delphi studies because it allows the researcher to approach panelist selection deliberately to gather a richer understanding of the phenomenon (Sedgwick, 2013). The group of panelists who participated in this study included industry professionals in the laying hen sector of the poultry industry. Many of this study’s participants fell into one or more categories: university faculty, extension educators, animal welfare specialists, and leaders in professional poultry organizations.

Findings

Round 1

By applying a SWOT analysis framework to capture experts’ perceptions of raising laying hens for niche markets, e.g., cage-free, free-range, organic, or pasture-raised egg production, 87 unique statements emerged that included 25 strengths, 28 weaknesses, 21 opportunities, and 13 weaknesses.

Round 2

In round two, the participants were asked to evaluate the 87 emergent statements from round one using a six-point, Likert-type scale. Of the statements evaluated, 55 (63.21%) items reached consensus in round two. In particular, 12 (48.0%) of the 25 strengths considered reached a consensus in round two (see Table 1).

Table 1

Strengths (n = 12) that Experts Reached an Agreement on Regarding Producing Laying Hens for Niche Markets, e.g., Cage-Free, Free-Range, Pasture-Raised, or Organic Egg Production in Round Two

Item	<i>M</i>	<i>SD</i>	% Agreement
Product differentiation.	5.18	0.751	86.3
Non-Traditional/Niche producers (pasture-raised, cage-free, etc.) can target specific market concerns.	5.09	0.944	84.8

Item	<i>M</i>	<i>SD</i>	% Agreement
Non-Traditional/Niche markets benefit from positive consumer perceptions.	5.00	0.775	83.3
Packaging for non-traditional/Niche eggs is more appealing.	4.91	0.701	81.8
Flexibility to produce variety.	4.91	1.446	81.8
More options for retailers.	4.82	0.874	80.3
Birds can exercise and move more in cage-free systems.	4.82	1.328	80.3
Traditional production allows for daily health and wellbeing inspections.	4.82	0.982	80.3
Animal welfare certifications.	4.73	0.905	78.8
Traditional production methods allow for consistent access to food and water.	4.73	1.421	78.8
Consumer perceptions of the industry are enhanced.	4.64	0.674	77.3
Technical support is improving and increasing.	4.55	0.934	75.8

Note. All items in round two were presented on a six-point, Likert-type scale.

Of the 28 weaknesses identified in round one, 19 items (67.8%) reached consensus in the second round. Table 3 three provides a list of weaknesses that reached consensus on in round two.

Table 3

Weaknesses (n = 19) that Experts' Reached a Consensus on Regarding Producing Laying Hens for Niche Markets, e.g., Cage-Free, Free-Range, Pasture-Raised, or Organic Egg Production in Round Two

Item	<i>M</i>	<i>SD</i>	% Agreement
Non-traditional/Niche production requires higher input costs.	5.40	0.843	90.0
Non-Traditional/Niche production allows for a higher chance for internal parasites.	5.40	0.699	90.0
Non-traditional/niche housing may expose poultry to more predation.	5.40	0.699	90.0
Consumers are confused by the terms that are used to identify housing systems and methods of production.	5.40	0.843	90.0
Non-Traditional/Niche operations use more land but produce less.	5.20	0.789	86.7
Poultry in non-traditional/niche housing systems may experience unintended welfare issues that producers were not aware of.	5.10	1.101	85.0
Disease mitigation in non-traditional/niche housing is difficult.	5.10	1.287	85.0
Animal welfare certifications (e.g., Certified Humane)	5.00	1.247	83.3

Item	<i>M</i>	<i>SD</i>	% Agreement
are costly.			
Non-Traditional/Niche housing requires a longer payback period on land mortgage.	5.00	1.054	83.3
Non-Traditional/Niche operations produce less but sell for higher prices.	5.00	0.816	83.3
Non-traditional/Niche methods incur higher mortality rates.	4.90	0.876	81.7
Efficiency and environmental controls (e.g., temperature) are more fluid in non-traditional/niche operations.	4.80	1.229	80.0
Marketing Non-Traditional/Niche eggs can sometimes become too complicated and confusing.	4.70	0.823	78.3
Costs often exceed profits for Non-traditional/Niche production.	4.70	0.823	78.3
Non-Traditional/Niche production does not allow for tools and resources (e.g., antibiotics) to help fight disease.	4.70	1.337	78.3
Technical needs are abundant but necessary to improve efficiency of non-traditional/niche production.	4.60	0.843	76.7
Land for pasture is expensive and not easily attainable.	4.60	1.578	76.7
Non-Traditional/Niche production can experience difficulty attaining a viable volume.	4.50	1.716	75.0
Non-Traditional/Niche production allows consumers to believe that higher welfare standards are in place but if standards are not adhered to, consumers could become disenfranchised.	4.50	0.707	75.0

Note. All items in round two were presented on a six-point, Likert-type scale.

In the second round, the experts were asked to evaluate 21 opportunities that were identified in round one. As a result of this process, 13 opportunities (61.9%) reached a consensus during round two (see Table 3).

Table 3

Opportunities (n = 13) that Reached Consensus from Experts' Regarding Producing Laying Hens for Niche Markets, e.g., Cage-Free, Free-Range, Pasture-Raised, or Organic, in Round Two

Item	<i>M</i>	<i>SD</i>	% Agreement
Production and marketing expectations from animal welfare groups should be clear.	5.50	0.707	91.7
Opportunities for distinct marketing can allow for product differentiation.	5.40	0.516	90.0
Consumer education.	5.30	0.675	88.3

Item	<i>M</i>	<i>SD</i>	% Agreement
Production and marketing expectations from volume food buyers should be clear.	5.30	0.823	88.3
Production and marketing expectations from consumers of marketing claims should be clear.	5.30	0.823	88.3
Non-traditional/Niche production methods allow for more variety.	5.20	0.789	86.7
Production and marketing expectations from the egg industry should be clear.	5.10	1.287	85.0
Consumer demands grow niche markets.	4.80	0.789	80.0
Opportunities for transparency are increasing in traditional production.	4.80	1.033	80.0
Consumers have higher expectations for producers to "live up to" their marketing claims.	4.80	0.632	80.0
Traditional production methods create equal access to high quality protein for lower socioeconomic households.	4.80	1.687	80.0
Industry collaboration to create universal standards for all methods of raising.	4.70	1.829	78.3
Locally grown and marketed eggs increase sales at farmers markets.	4.60	0.843	76.7

Note. All items in round two were presented on a six-point, Likert-type scale.

In the second round, the experts evaluated 13 threats that emerged from round one. Of the 13 statements considered in the second round, 11 (84.6%) reached a consensus of agreement.

Table 4

Threats (n = 11) that Reached Consensus Reached Consensus from Experts' Regarding Producing Laying Hens for Niche Markets, e.g., Cage-Free, Free-Range, Pasture-Raised, or Organic, in Round Two

Item	<i>M</i>	<i>SD</i>	% Agreement
Biosecurity and disease outbreaks.	5.50	0.707	91.7
Production costs to maintain label integrity are increasing (e.g., costs of organic grain, costs of land to ensure outdoor access).	5.20	0.632	86.7
Market oversaturation decrease profitability.	5.20	0.632	86.7
Fluctuations in the economy (e.g., prices of feed).	5.20	0.632	86.7
Negative impacts on animal wellbeing if alternative housing systems are not implemented correctly.	5.10	0.738	85.0
Label accuracy.	5.00	0.667	83.3

Item	<i>M</i>	<i>SD</i>	% Agreement
Demands and expectations of animal welfare and animal rights organizations.	5.00	1.247	83.3
Industrialization of agriculture will increase consolidation.	4.90	1.197	81.7
Financial insecurity for producers.	4.90	1.197	81.7
Negative consumer perceptions affect acceptability of current raising standards.	4.70	1.252	78.3
Decreasing consumer trust.	4.60	1.174	76.7

Note. All items in round two were presented on a six-point, Likert-type scale.

Round 3

In round three, at least one-half (50.00%) but less than two-thirds (<66.00%) of experts *Agreed* or *Strongly Agreed* with 14 of the 87 items they were asked to consider (see Table 3). In other words, these items did not reach a *consensus of agreement* during round two but met the criteria for reconsideration in round three. To reach a consensus in round three, at least three-fourths (75.00%) of panelists selected *Agree* for each item. Of the 14 items reconsidered in round three, 10 (71.4%) reached a consensus of agreement.

Table 3

Items (N = 10) that Reached a Consensus by Experts' Regarding Producing Laying Hens for Niche Markets, e.g., Cage-Free, Free-Range, Pasture-Raised, or Organic Egg Production in Round Three

Item	<i>M</i>	<i>SD</i>	% Agreement in Round Three
Strengths (n = 5)			
Marketing claims provide a shield from volatility within commodity markets.	1.83	0.389	91.5
Non-Traditional/Niche production allows for higher profit margins.	1.75	0.452	87.5
Smaller flock sizes translate to less risk when depopulation and disease are considered.	1.67	0.492	83.5
Non-Traditional/Niche markets have animal welfare standards that could improve welfare standards across the industry.	1.58	0.515	79.0
Weaknesses (n = 5)			
Producers of conventional eggs who raise high welfare flocks often incur more expenses.	1.83	0.389	91.5
Producer education is minimal, and producers of non-traditional/niche eggs have less knowledge about how to properly implement niche production methods.	1.83	0.389	91.5

Item	<i>M</i>	<i>SD</i>	% Agreement in Round Three
Larger scale non-traditional/niche operations are not feasible because of restrictions and limiting factors.	1.83	0.389	91.5
Non-Traditional/Niche production allows room for consumers to be unsatisfied with welfare standards because welfare standards vary across production methods.	1.67	0.492	83.5
There are significant space restrictions for non-traditional/niche operations.	1.58	0.515	79.0

Note. All items in round two were presented on a three-point, Likert-type scale. No *opportunities* or *threats* that were reconsidered in round three reached a consensus among the experts.

Conclusions

In recent years, the terms used to market shell eggs have confused and overwhelmed consumers ([Author Blinded], 2020). For example, research has indicated that consumers have become more disconnected from the food they purchase (Thompson et al., 2011; Zhao et al., 2015). As a result of this disconnect, consumers have been making ill-informed purchasing decisions (Ochs et al., 2018). When viewed through the lens of CBT (Fischer & Ury, 1991) this investigation examined industry experts' perceptions regarding the SWOT for producers raising laying hens for niche markets, e.g., cage-free, free-range, organic, and pasture-raised egg production.

The experts achieved a consensus on 65 items (74.71%). Therefore, we concluded that there were multiple SWOT for producers to achieve a competitive advantage. These factors could be essential to creating strategies for product labels and the marketing of niche egg products. We also concluded that the potential existed for egg producers to raise laying hens intended for niche markets based on current alternative housing options such as cage-free, free-range, organic, and pasture-raised egg production – a finding not previously reported in the broader literature. Despite this, it should be noted that although strengths and opportunities exist for producers, some important weaknesses and threats should be evaluated and addressed before pursuing an alternative egg production approach. To this point, the experts in this study agreed that 24 weaknesses existed in niche egg production, which was the highest number of items in any category to reach a consensus. Therefore, we conclude that if analyzing and comparing the opinions of expert panelists, the SWOT category of *weaknesses* should be critically analyzed prior to strategic planning (Chernov et al., 2016; Párraga et al., 2014). Further, agricultural communicators should partner with egg industry professionals to determine if accurate, yet effective information is being conveyed to consumers through the product's labeling. Because the experts reached a consensus that producers of niche eggs generally have less knowledge about how to implement niche production methods properly, we conclude that producer education should be prioritized. Further, because ambiguous definitions of alternative housing terms have persisted and a lack of producer education, the experts reached a consensus that marketing niche eggs have become too complicated and confusing. Therefore, we conclude that

communication efforts for niche eggs should be transparent while employing practical product differentiation approaches.

Regarding the emergent *strengths* identified by the expert panelists, we conclude that producers of niche eggs have not effectively targeted consumers' concerns when communicating and marketing their products. For example, consumers have become increasingly concerned about environmental impacts, sustainability efforts, animal welfare-related claims, and other ethically based product attributes (Powers & Roberts, 2022). Despite this, the expert panelists suggested that producers of niche eggs have not effectively addressed these concerns in practice. We also conclude that because niche market eggs typically have packaging that has been considered more appealing, the conventional egg market has become disadvantaged. The primary external factors (Görener et al., 2012; Coelho et al., 2018) were *opportunities* for niche egg producers, such as flexibility to produce a variety of different products and the ability to provide more options for retailers (e.g., cage-free, antibiotic-free, non-GMO). Finally, we conclude that the *threats* that niche egg producers should consider were the accuracy of their information on product labels, financial insecurity, and increasing production costs to maintain label integrity – a sentiment that has not been explored in recent empirical evidence.

Discussion, Implications, and Recommendations

Understanding industry expert perceptions of the experiences of niche market egg producers has become vital. Future efforts to address the *weaknesses* that panelists reached a consensus on should be targeted and specific – a key tenant of CBT (Fischer & Ury, 1991). Therefore, we recommend that egg companies and brands create formal communication and education strategies for producers before establishing contractual agreements. The majority of experts agreed that producer education has been minimal, and producers of niche eggs have less knowledge about how to implement niche production methods properly. Based on this, we recommend that producer education efforts be prioritized. Advocates in the egg industry should also champion adopting new policies to better meet the consumer's needs as their demands continue to evolve. The experts also agreed that negative consumer perceptions have affected the acceptance of current raising standards. Therefore, we recommend that industry professionals and communicators in poultry organizations develop consumer education strategies that are sophisticated and considerate of consumer distrust.

We also recommend that the poultry industry develop refined strategies for developing and maintaining positive relationships with animal welfare-based organizations. For example, the experts reached a consensus that the demands and expectations of animal welfare and animal rights organizations were a significant *threat*. Therefore, we recommend that the poultry industry's conventional and niche production sectors collaborate to develop a cohesive and stringent set of regulations and standards for each method of niche egg production. This could aid in the enhancement and development of food labeling policies. We also recommend that the poultry industry seek counsel and insight from agricultural communicators when creating such standards. The experts suggested that niche eggs' marketing potential and product differentiation were strengths, opportunities, and weaknesses. Because marketing and communication has become vital to sales, the tactics used by the niche egg industry should be transparent and

concise. Further, we recommend that future research regarding the communication and branding of niche egg products aim to develop a more profound understanding of consumer preferences. We also recommend that future research evaluate and critique the current producer and consumer communication and education efforts employed by leading organizations in the poultry industry using a CBT lens (Fischer & Ury, 1991). Conducting research in this manner could allow industry professionals and leaders to determine mutual concerns, needs, and interests. This approach to collaboration and determination of mutuality could lead to the development of education and training efforts, which could help them capitalize on their competitive advantages while determining the level of transparency desired by consumers.

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Does the Mentorship of Cooperating Teachers Meet the Needs of Their Student Teachers? A Mixed-Methods Exploration

Abstract

The student teaching internship experience is one of the most fundamental experiential learning opportunities for pre-service teachers during their traditional university certification process. During the internship, cooperating teachers play a pivotal role in creating an impactful experience for their student teachers. Cooperating teachers are being asked to take on the role of mentor when leading their student teachers to develop stronger teaching skills and the ability to manage a school-based agricultural education program. However, cooperating teachers are not always clear about their exact roles as a mentor and are in need of additional preparation and support. This study compares the perceived demonstration of mentorship by cooperating teachers and the observation of this mentorship by the student teacher after the implementation of a cooperating teacher support program at the University of Florida Department of Agricultural Education and Communication. The results suggest cooperating teachers are utilizing best practices for mentoring within all three areas of social support, professional support, and role modeling. The need for cooperating teachers to explain to student teachers why they do what they do was revealed. Further research in the preparation and support of cooperating teachers is necessary to continue to paint a picture of how these mentor behaviors are being implemented across the profession.

Introduction

Beginning teachers often feel overwhelmed by the transition into the classroom, however an increased self-efficacy from a successful student teaching (ST) experience could help with this transition (Edgar et al., 2011; Kasperbauer & Roberts, 2007; Roberts, 2006; Rocca, 2005). A successful ST experience has also been shown to have a direct impact on new teachers' ability to enter their own classroom prepared to positively impact their students' learning (Darling-Hammond & Bransford, 2005). Previous research has indicated that cooperating teachers (CT) have one of the most significant roles in creating this successful experience (Matsko et al., 2020; Roberts, 2006; Young & Edwards, 2005). Mentoring programs have been widely utilized across the profession to increase teacher self-efficacy and lower the high attrition rates plaguing the profession (Swan et al., 2011). Just as mentors are working with new teachers, CTs are being asked to elaborate their role towards a mentorship centered approach. In 2006, Roberts developed a model for CT effectiveness as a foundation within school-based agricultural education (SBAE) to develop CTs for their role as mentors. Additionally, He (2010) began to discuss how mentoring programs can help CTs lead their STs to develop stronger teaching skills to have a successful start to their teaching career. Even so, CTs across the profession still express confusion around the mentorship components of their role (Dunning et al., 2011).

Professional development that supports mentoring skills for CTs has previously been limited at the university level (Carroll, 2007; Margolis, 2007). Often, CTs are provided a CT handbook and briefed on the expectations of the STs and the evaluation materials (Spencer, 2007; Zimpher & Sherril, 1996). To strengthen the CT's mentorship skills, formalized

preparation and support for mentoring needs to be provided throughout the ST internship experience (Young & MacPhail, 2005). Over a decade ago, Hamilton (2010) began to reveal CTs' perceived needs for this preparation and support. He stated that CTs needed more engagement from their universities, a more in-depth selection of ST partners, additional classes geared towards mentoring skills, and better guidelines for gradually releasing STs into a full teaching experience (Hamilton, 2010). Additionally, research supporting the relationship of the CT and their ST as mentor and mentee has indicated the need for CTs to implement best practices for mentoring (Korte & Simonsen, 2018). These practices can be categorized into three overarching themes: *social support*, *professional support*, and *role modeling* (Alemdag & Simsek, 2017; Russell & Russel, 2011). Along with understanding the best practices for mentoring, a mutual understanding of mentor and mentee roles should be sought after to increase the benefits of the CT and ST relationship (Kajs, 2002). The ST needs guidance in how to receive and utilize the mentorship, just as the CT needs guidance and training for their role (McIntyre & Killian, 1987). Beginning to understand how these best practices are being implemented during the ST internship experience could help practitioners effectively create and maintain successful mentorship programs for their CTs and STs (Barry, 2019; Nesbitt et. al, 2022).

Conceptual Framework

For this study, we utilized an epistemological lens rooted in constructivism and grounded in the findings that CTs have one of the most impactful roles in the ST internship experience for creating effective STs (Cochran-Smith, 1991; Darling-Hammond, 2006; Joyce & Showers, 1982; Kagan, 1992). Constructivism is based on the assumptions that learners create their knowledge of worldly understandings based on their own understanding of experiences (Vijaya Kumari, 2014; Vygotsky, 1978). By using this lens, we can begin to understand the mentorship that occurred between the CT and ST by examining their lived experiences of the mentorship that occurred during the ST internship experience. Mentorship skills that are explored in this study support three major components of a successful mentorship program: *social support*, *professional support*, and *role modeling* (Alemdag & Simsek, 2017; Barry, 2019; He, 2010; Russell & Russel, 2011). Utilizing Roberts' (2006) Model of Cooperating Teacher Effectiveness, more specifically the area of the ST/CT Relationship, efforts are needed to develop the mentorship skills of the CT and preparing the next generation of school-based agricultural educators (SBAE) (Clarke et. al, 2014). Additionally, Social Desirability Bias (SDB) was also drawn upon for this study. SDB is a participant's unintentional altering of a response to appear more desirable to what they believe the researcher wants to hear (Beretvas et. al, 2002). SDB can impact the research in several ways, however the potential of the CT altering their description of their use of best practices is an area of exploration in this study. In order to combat SDB, the STs' experiences were compared to the CTs' to paint a more robust view of mentoring practices during the ST internship (Goneya, 2005).

Research Questions

This study aimed to describe the mentorship of CTs and how that mentorship met the needs of their STs. The study was guided by the following research questions:

1. How do the mentorship experiences within social support of the CT and ST compare?

2. How do the mentorship experiences within professional support of the CT and ST compare?
3. How do the mentorship experiences within role modeling of the CT and ST compare?
4. How do the demographics of CTs play a role in their use of mentoring best practice behaviors?

Methods

This study utilized an explanatory sequential mixed-methods approach to address the research purpose and objectives (Creswell & Plano Clark, 2018). Utilizing this method, helped us gain additional insight of the qualitative results by qualitatively explaining how the mentoring best practices were utilized during the internship experience. The University of Florida Department of Agricultural Education and Communication established a mentorship training program for their CTs in 2018. The program's core goal is to prepare and support CTs for their mentorship role before and during the ST internship experience. The program focuses on best practices for mentoring within the topics of social support, professional support, and role modeling (Alemdag & Simsek, 2017; Barry, 2019; Russell & Russel, 2011). The program's main components in supporting these best practices for mentoring behaviors are a pre-internship workshop, bi-weekly emails and infographics to CTs concentrating on one mentorship skill, monthly collaborative zooms, and a CT support website. Beginning Fall 2020, STs were included in the pre-internship workshop, and training was provided to the STs on how to receive and utilize feedback from their CTs. The STs and CTs were given time to plan for lesson topics and other SBAE program components. The target population for this study was secondary school-based agricultural education teachers who served as CTs, as well as their STs, during the University of Florida's Spring 2022 ST internship ($N = 15$ Pairs). Using a purposive sampling technique, all CTs and STs from the Spring 2022 internship who participated in all aspects of the CT support program were recruited for this study.

A total of 15 CTs and their 15 STs completed the quantitative survey, providing a 100% response rate. At the completion of the 14-week student teaching internship, survey questionnaires were distributed via Qualtrics software. Seventeen best practices for mentoring behaviors were included in the survey. These behaviors were organized into the three constructs: perceived frequency use of professional support, perceived frequency use of social support, and perceived frequency use of role modeling. These best practices for mentoring behaviors were created from the work of Alemdag and Simsek (2017) and Russell and Russell (2011). Combined, their works focused on practicum experiences of pre-service teachers and the implications for more formal mentoring programs (Alemdag & Simsek, 2017; Russell & Russell, 2011). The constructs that included the 17 best practice for mentoring behaviors were vetted by three agricultural education faculty at the University of Florida to ensure content validity. Using a frequency scale, the construct asked respondents to rate the frequency of use of the 17 best practices for mentoring behaviors. The response options were as followed (1) *always*, (2) *often*, (3) *sometimes*, (4) *rarely*, and (5) *never*. The CTs self-reported their frequency of use of the 17 best practices for mentoring behaviors, and the STs reported on their observation of their CT's mentoring behaviors. This study was piloted in 2019, and a Cronbach's alpha of $\alpha = .82$ was calculated for the constructs which measured the frequency of use of best practices for mentoring. The 2019 study only measured the reported frequency by the CT. For the 2022 cohort, CT self-reported behaviors, as well as the observed behaviors from the STs were collected. The CT instrument in 2022 had a Cronbach's alpha of $\alpha = .83$. The ST instrument

utilized the same best practices behaviors as the CT instrument but from the perspective of the ST. The ST instrument had a Cronbach's alpha of $\alpha = .96$. For data analysis, we used the Statistical Package for Social Sciences (SPSS) to look at the descriptive statistics of the three areas of mentoring behaviors and calculated the frequency percentage for CTs and STs for the 17 mentoring behaviors.

While the descriptive statistics explained the frequency of use of the best practices for mentoring behaviors from the lens of CTs and STs, additional clarification on how these best practices were implemented. The qualitative investigation was guided by a phenomenological approach, where we aimed to gain additional insight into how the participants' lived experiences through the CT support program effected their knowledge, perspective, and interpretation for how to implement mentoring best practices (Creswell, 2013). All CT and ST respondents were asked to participate in one-on-one follow up interviews. Of the 15 CTs and 15 STs, four CTs and five STs agreed to participate. Of these participants, two matched CT-ST pairs emerged. In other words, the CT and the ST that interned with them both agreed to participate in the interviews. For this study, participants were given pseudonyms to maintain anonymity. Semi-structured interviews were utilized for data collection. Two experts in the field of agricultural education and qualitative research reviewed the interview protocol for increased validity (Saldana, 2013). The protocol allowed the participants to share their experiences of mentoring and being mentored. During the interview, probing questions were utilized to gain a deeper understanding of their experiences. The individual interviews lasted between 45 to 60 minutes and were recorded and transcribed through Zoom. Following the assignment of pseudonyms using a random name generator, transcripts were reviewed for accuracy. Once accuracy was verified, a two read process was conducted to refamiliarize with the experiences of the CTs and STs (Saldana, 2013). In the third read, the predetermined constructs led to the structural codes that were utilized to distinguish the usage of best practices. The three major components of best practices for mentorship were *social support*, *professional support*, and *role modeling* (Alemdag & Simsek, 2017; Barry, 2019; He, 2010; Russell & Russel, 2011; Saldana, 2013). Subsequently, in vivo coding was used further allow themes to emerge within the structural codes (Saldana, 2013.)

To ensure trustworthiness, investigator triangulation was utilized through field notes and participant observation of facial expressions and vocal tones. Member checking was also utilized with the participants to establish credibility in trustworthiness. Additionally, peer debriefing was used to ensure the researcher's results remained accurate (Creswell & Creswell, 2018). Reflexivity is important because it acknowledges the researcher's background and bias as the primary research tool (Creswell, 2013). It helps the researcher, participants, and audience legitimize the claims from the research process. The two researchers involved in this study are both former secondary agriculture teachers and FFA advisors. Both researchers have previously taught in the same region as the data was collected. The research team consisted of a faculty member and doctoral student at University of Florida Department of Agricultural Education and Communication at the time of data collection and writing. The researchers also led the CT support program and professional development. The researchers acknowledge their biases from their own lived experiences as teachers, CTs, and within teacher preparation. They were cognizant of their own opinions regarding the support of CTs.

Findings

Research Question 1. How do the mentorship experiences within social support of the CT and ST compare?

Table 1 summarizes the perceived demonstration and observation frequencies for the best practices for mentoring in the area of social support. For three of the four best practices, the CTs felt they were demonstrating the best practices more than the STs observed. Additionally, most CTs perceived themselves to be *always* implementing all four best practices for social support. Most of the STs observed this as well. Alternatively, some of the STs *rarely* observed two of the mentoring behaviors. These behaviors were *provided weekly comprehensive feedback on performance in an uninterrupted setting* and *supported my student teacher’s effort by staying attuned to their mindset, attitude, and well-being*.

Table 1

CT’s Perceived Demonstration (n = 15) and STs Perceived Observation (n = 15) of Best Practices for Social Support Mentoring Behaviors.

Behavior	Percentage (%)									
	Always		Often		Sometimes		Rarely		Never	
	CT	ST	CT	ST	CT	ST	CT	ST	CT	ST
Provided weekly comprehensive feedback on performance in an uninterrupted setting	53	53	33	13	13	13	0	20	0	0
Communicated openly with my student teacher/intern	73	80	20	13	7	7	0	0	0	0
Supported my student teacher’s effort by staying attuned to their mindset, attitude, and well-being	80	67	20	20	0	7	0	7	0	0
Communicated regularly with my student teacher/intern	87	73	13	20	0	7	0	0	0	0

The qualitative data was used to further investigate how these social support best practices were being implemented during the internship experience. Communication emerged as a leading topic in social support, and the CTs explained in-detail how communication occurred between them and their ST. Like the quantitative results, comprehensive feedback and staying attuned to their ST’s mindset and well-being were not shared in such detail by the CTs. One CT, Ms. Lang, highlighted her openness with her ST by stating, “I’m pretty direct. You know where you stand with me, and you know what I think. So, I was able to, like, express that.” Comparably, the STs also explained how open their CTs were throughout the entire internship process. They mentioned communication occurring before and after school, during lunch, between lessons, in the evenings, and on the weekends. The STs expressed their appreciation for their CTs being willing to answer quick questions about lesson planning outside of school hours.

Grace recognized that her negative internship experience within social support could have been due to her own lack of communicating her thoughts and needs to her CT. Although short in detail, the CTs talked about how their relationship with their ST was able to grow throughout the internship experience. Mr. Porter expressed how he began to recognize his ST’s well-being by explaining the process of stepping in when needed. He stated:

You want your intern to be ready. But they're not going to be ready right away...it takes small steps...it goes back to them being successful...you don't want them to have a bad experience...so taking those small steps, it's just not a just one and done plunge.

Contrary to the quantitative results, all STs expressed noticing their CTs being in-tune with their personal well-being. Interestingly, the STs shared details about how their CTs stepped in to help with behavioral corrections in the classroom when explaining their well-being being positively influenced by their CT.

Research Question 2. How do the mentorship experiences within professional support of the CT and ST compare?

Table 2 summarizes the perceived demonstration and observation frequencies for the best practices for mentoring in the area of professional support. For the majority of these seven best practices, the CTs felt they were demonstrating the best practices more than the STs observed. Even so, over half the CTs stated a frequency of *often* or less for three out of the seven best practices. Those behaviors were *encouraged the student teacher to maintain active memberships in FAAE, NAAE, and FACTE, used observational data as the basis for feedback sessions, and shared approaches for effectively managing the administrative aspects of teaching, including building effective relationships with administrators and other teachers.* Alternatively, only one behavior was perceived less than *always* by most STs: *encouraged the student teacher to maintain active memberships in FAAE, NAAE, and FACTE.* However, all seven of the best practices for professional support mentoring behaviors were observed by one or more STs as *rarely* or *never* demonstrated.

Table 2

CT’s Perceived Demonstration (n = 15) and STs Perceived Observation (n = 15) of Best Practices for Professional Support Mentoring Behaviors.

Behavior	Percentage (%)									
	Always		Often		Sometimes		Rarely		Never	
	CT	ST	CT	ST	CT	ST	CT	ST	CT	ST
Encouraged the student teacher to maintain active memberships in FAAE, NAAE, and FACTE	40	40	33	7	13	13	0	20	13	20
Used observational data as the basis for feedback sessions	40	53	53	27	7	13	0	7	0	0

Behavior	Percentage (%)									
	Always		Often		Sometimes		Rarely		Never	
	CT	ST	CT	ST	CT	ST	CT	ST	CT	ST
Shared approaches for effectively managing the administrative aspects of teaching, including building effective relationships with administrators and other teachers	47	73	47	7	7	7	0	13	0	0
Made an effort to help my student teacher develop positive views of teaching	53	60	47	13	0	20	0	7	0	0
Discussed strategies for effectively managing time, priorities/projects, and email	53	67	47	13	0	7	0	0	0	13
Encouraged the student teacher to take the lead in evaluating their teaching	73	67	27	20	0	0	0	7	0	7
Made an effort to introduce my student teacher to the school community	80	73	20	13	0	7	0	7	0	0

Based on interviews, the feedback from participants did not align with the survey data. Feedback was expressed with the most appreciation from the STs. The STs elaborated on how their CTs utilized both formal and informal modes of feedback. They told stories about quick check-ins between classes, before and after school, and at lunch, as well as how open their CTs were in providing direct feedback about their lesson plans after school hours. On ST, Mandy, explained, “My favorite thing was she'd [ask], ‘what do you think went well?’ Or... ‘what happened?’... And if I didn't bring [something she saw] up...she would give me specific things like, ‘well, what about when this happens?’” Similarly, the CTs also explained their extensive use of informal feedback with their ST and elaborated on their use of observational note-taking guides for their feedback. Ms. Adkins explained:

I would always give her at the end of a, like, written observation, like, here's what I want you to do next week, and then next week, I would go, okay, did we meet that goal? Like, where are we trying to get? Did we get there? So, some weeks, we didn't get there, but we set ... that same goal for the next week.

Additionally, participants shared more details about introductions to the school and community and time management. Ms. Wilson specifically talked how she explained the importance of building relationships with school staff, especially the maintenance staff, with her ST. Furthermore, all four CTs explained how they emphasized time management and keeping up with the daily tasks of being an agriculture teacher (i.e., administrative tasks, land lab maintenance, FFA planning and paperwork, etc.) but did not explain *why*. Mandy, Zack, and Kristin also explained how their CTs emphasized finding a work-life balance to sustain a career

as an agriculture teacher. Lillie was left questioning if a work-life balance was possible after watching how her CT navigated day-to-day operations of her program.

Research Question 3. How do the mentorship experiences within role modeling of the CT and ST compare?

Table 3 summarizes the perceived demonstration and observation frequencies for the best practices for mentoring in role modeling. For all six of the best practice behaviors, the CTs felt they were demonstrating the best practices more than the STs observed. Two of the behaviors had a majority of CTs state a frequency of *often* or less. Those behaviors were *involved my student teacher in all of my roles as a teacher* and *talked to my student teacher about how to become an excellent teacher through all phases of their career*. Only one behavior was perceived less than *always* by most STs: *involved my student teacher in all of my roles as a teacher*. However, all six of the best practices for professional support mentoring behaviors were observed by one or more STs as *rarely* or *never* demonstrated. Of these six, one behavior had a combined *rarely* and *never* frequency rate higher of 27% for perceived observation from the ST: *shared my approaches for SAE program development and supervision*.

Table 3

CT's Perceived Demonstration (n = 15) and STs Perceived Observation (n = 15) of Best Practices for Role Modeling Mentoring Behaviors.

Behavior	Percentage (%)									
	Always		Often		Sometimes		Rarely		Never	
	CT	ST	CT	ST	CT	ST	CT	ST	CT	ST
Involved my student teacher in all of my roles as a teacher	47	40	47	20	7	27	0	7	0	7
Talked to my student teacher about how to become an excellent teacher through all phases of their career	47	67	53	20	0	7	0	0	0	7
Discussed effective student discipline strategies with my student teacher for maintaining a productive learning environment	53	53	47	20	7	20	0	7	0	0
Coached my student teacher on strategies for developing a positive rapport with students	53	53	47	27	0	7	0	7	0	7
Shared my approaches for SAE program development and supervision (n = 14)	73	60	27	0	0	7	0	20	0	7
Shared my philosophy for FFA advising (n = 14)	87	67	7	7	7	7	0	13	0	0

The qualitative data echoed the low frequency rates in role modeling. While the STs were able to explain how they noticed their CT navigating their roles as a teacher, FFA advisor, and SAE supervisor, many stated they never discussed these topics with their CT. The STs could explain what they saw their CT do but could not elaborate on their CTs philosophies behind why they chose their actions. When talking about the teaching profession, most of the CTs expressed how they emphasized the importance of being a life-long learner to their STs, with all four CTs having discussions with their STs about building rapport with students. Mr. Porter said, “I probably did that through demonstrating... Trying to make it fun, or it's just not. You can enjoy the experience. It's work. But it can be enjoyable as well. So, I let her see that I have fun doing it.” The STs had mixed statements when talking about the teaching profession. Often their CTs explained their own experiences as new teachers, but only Mandy, Zack, and Kristin explained how their CT talked to them about how their teaching career has changed and what they did to continue to improve as teachers and remain happy throughout their career.

Research Question 4. How do the demographics of cooperating teachers play a role in their use of mentoring best practice behaviors?

The fourth research question was to explore the participants demographics. For the quantitative phase, both experienced and first-time CTs were represented. Additionally, the CTs were also represented by a wide range of teaching experience and initial certification paths, and males and females were represented. Table 4 summarizes the CT participant demographics for the quantitative phase. Additionally, Table 5 summarizes the ST participant demographics.

Table 4

Demographics of the CT respondents (n =15)

Variables	Categories	<i>n</i>	%
Sex	Male	6	43
	Female	9	60
Initial Certification	Ag Ed at University of Florida	11	73
	Teacher certification in another teaching field	2	14
	Non-education Major	2	14
Years Teaching	5-10 years	3	21
	11-15 years	4	29
	16-20 years	1	7
	Over 20 years	7	47
Number of Previous Interns	No Previous Interns	5	36
	1-2 Interns	4	29
	3-4 Interns	2	14
	5 or more Interns	4	29

Table 5*Demographics of the ST respondents (n = 15)*

Variables	Categories	<i>n</i>	%
Sex	Male	3	21
	Female	12	80
Age	19-20 years old	3	21
	21-22 years old	4	29
	23-24 years old	4	29
	25-26 years old	2	14
	27+ years old	2	14

For the qualitative phase, the CT participants consisted of three traditionally certified female teachers and one alternatively certified male teacher. They all taught between 10 to 25 years, and the one male participant was the only member to have previously hosted a ST. The ST participants consisted of four females and one male member, with all STs expressing positivity for the SBAE teaching profession and deciding to enter the profession following their ST internship experience.

Conclusions

This study's purpose was to describe the mentorship of CTs and how it met the needs of their STs in a SBAE program. While we recognize these findings to be Florida specific, we believe these findings help to paint a picture of the mentorship experiences that are occurring between CTs and STs within SBAE. We also acknowledge that the qualitative data does not necessarily represent the entire group. Through this research, we were also able to understand specific practices by mentors in the areas of social support, professional support, and role modeling, as well as investigate variation in how participants implemented their mentorship practices within the 2022 cohort (Alemdag & Simsek, 2017; Barry, 2019; Russell & Russel, 2011).

For all practices, STs felt that their mentor would often demonstrate something rather than explain it. In other words, they might show them how they manage an FFA activity but did not explain *why* that was their specific approach. The CTs appeared to echo what the STs stated, indicating that the CTs were recognizing their method of mentoring, and the sometimes lack of, explanation involved in these methods. There was one pair that did not share the same perspective of mentorship practices during the ST internship experience. The CT felt confident in how they handled the ST internship experience and the support that they gave their ST. However, their ST felt their CT was often distracted and put too much emphasis on teaching for an exam that was given during the ST internship experience. This misalignment could be attributed to the CTs focus on how the exam preparation should be delivered and the emphasis on student passing rates and district/school expectation, rather than giving the ST free-range with their creativity in how they approached lessons.

For research question one, we compared the perspectives of the CT and ST for frequency of use of best practices for social support mentoring behaviors. We wanted to compare the

teachers' self-perceived frequency of social support mentoring best practices and compare that to the perspective of the student teacher, who would be on the receiving end of these mentoring best practices. Overall, the CTs and STs perceived implementation of these best practices were aligned. While all four of the best practices in this area had over a 50% of participants rank their perceived demonstration and observation with a frequency of *always*, there is space for improving how mentor teachers can stay better attuned to the needs of their mentees during the ST internship. Interestingly, when analyzing the data from the interviews, the ST participants provided in-depth descriptions of their CTs implementations of these practices. They described the communication processes in alignment with the best practices that were encouraged in the CT support program and expressed gratitude towards their CTs for supporting their mental well-being throughout the internship (Alemdag & Simsek, 2017; Russell & Russell, 2011). Additionally, the STs seemed to thrive when their CTs stayed in constant communication with them about their teaching practices and other SBAE priorities that they were part of, including FFA and SAE's. This could be attributed to the current generation of students feeling like they need constant feedback to grow professionally (Half, 2015).

Research question two compared the perspectives of the CT and ST for frequency of use of best practices for mentoring behaviors around professional support. Unlike social support behaviors, CTs and STs perceived implementation was not aligned for mentoring behaviors supporting professional support. It is plausible that the CTs self-reported implementation could be skewed by their desire to look more successful, while the STs perceived observation may be the more accurate depiction of what is occurring during the ST internship experience (Beretvas et al., 2002; Goneya, 2005). The qualitative portion for this objective painted a clearer view of the self-reported frequencies. The ST participants often explained how they observed their CT managing their many roles as a SBAE teacher, but STs reported that their CTs did not discuss *why* they chose their specific approach.

Research question three compared the perspectives of the CT and ST for frequency of use of best practices for role modeling mentoring behaviors. The CT and ST frequency responses were mostly congruent. The STs and CTs agreed that the frequency of use of the best practices within this area were low. The STs recognized their CTs did not elaborate on *why* they did what they did, and the CTs felt that they could have spent more time discussing their philosophies for FFA and SAEs. The findings show that STs want more explanation behind their CTs actions and how this aligns to their personal and professional philosophies, and the CTs recognized that they needed improvement.

For research question four, we explored the demographics of the participants and their use of mentoring best practice behaviors. Forty percent of the CTs had previously hosted three or more STs. These were the CTs whose STs observed the highest and the lowest frequency for implementing best practices. This could be attributed to the CTs either being highly motivated to continue to grow in their implementation of these practices or they may have felt their experience alone was enough to support their role as a mentor. Interestingly, age, initial certification path, and years of teaching experience showed minor variation in ST frequency responses.

Recommendations/Implications

We recommend CTs become more familiar with the three major areas for best practices for mentoring prior to the ST internship experience. Ideally, they should work to develop their mentorship skills through university programs or other mentorship training opportunities. CTs should be encouraged to self-reflect on their mentorship practices. We recommended that CTs remind themselves to slow down and make the time to walk their STs through their thought processes. This means not only showing students how to do things but helping them understand the “*why*” behind it. Additionally, CTs should be reminded that their explanation and sharing of their philosophies and the reasoning behind their actions to their STs is valuable for the professional growth of the preservice teacher. STs will benefit from both seeing and hearing why their CTs do what they do.

For university faculty that work closely with CTs, we recommend incorporating a preparation and support program geared specifically towards building mentorship skills. If this type of program is planned, we recommend that it be implemented in stages, so that the needs of both CTs and STs can be assessed and supported. It is imperative to look for all gaps that could be addressed by these support programs. Through interviews in this study, an added emphasis on building a community of CTs emerged. This feeling of community can be fostered through communication and regular, synchronous sessions on platforms like zoom to provide an additional layer of support and the opportunity for conversations amongst CTs.

Program support components could include a resource website or specific page on a departmental website for CTs that contains regularly used forms, mentoring materials, and any other supporting items that can be easily accessed. Most student teaching internships utilize a handbook or guide for STs, we recommend procuring and using a CT teacher manual that focuses on resources that support them in their role as a mentor. Additionally, we recommend that university faculty work to demonstrate their own mentorship skills while interacting within the triadic model of ST, CT, and university supervisor that is often seen during the ST internship experience. Inclusion of the university supervisors in professional development and synchronous sessions is recommended to help build a stronger relationship between the university program and school sites.

Additionally, we recommend the continued exploration of the lived experiences of the CTs and STs during the ST internship experience. These observations begin to help practitioners understand what is occurring in the day-to-day interactions between the CTs and STs. Ultimately, trying to understand the relationship and needs of CTs and STs can help create preparation and support programs that can better prepare CTs in their role as mentors for STs. These STs are at the cusp of their agriscience teaching career and the influence of their CT and the influence from this type of program could have a lasting impact on their decision to teach and remain in the profession. It is recommended to implement this type of program in multiple states and regions to bring in a more robust view of the experiences of CTs and STs across the profession. Findings from this study’s phenomenological exploration can begin to help practitioners to develop similar programs within teacher preparation programs (Barry, 2019; He, 2010).

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A Historical Review of Urban Cooperative Extension in the United States with Special Emphasis on the Southern Region

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Abstract

The United States is increasingly urbanizing, and the communities served by Extension look different today than in 1914 when the nation's Cooperative Extension Service was established. Many communities are generally more diverse than ever before and face complex challenges unique to urban environments. These factors have led to an ongoing discussion among Extension professionals as to what form Cooperative Extension programs should take in the future and how strategic approaches to Extension may look different in urban contexts. This debate, however, is not a new one; the trend toward urbanization has been an issue since the early years of the Cooperative Extension Service. Using historical research methods, we analyzed the discussions around urban Extension nationally from 1914 to the present day and identified specific approaches to urban Extension across 13 southern region states.

Introduction

On its founding through the Smith-Lever Act of 1914, the Cooperative Extension Service (CES) was created with the mission of aiding in the diffusion of useful and practical information (Hildreth & Armbruster, 1981) pertaining largely to agriculture and rural development in the United States. Its purpose was to foster change in American society and to help rural communities thrive. While the founding mission of the CES remains the same today, the populations it serves have changed. In 1914, more than 80% of the U.S. population resided in rural communities; today more than 80% lives in urban areas and this trend has brought significant and enduring demographic changes to the many communities CES serves (Ruemenapp, 2017).

Honoring the Past While Facing the Future – The Challenge

Although similarities persist in Extension's work across all geographic settings, dynamic conditions and increased diversity in cities present unique challenges and opportunities. To embrace effective urban Extension approaches, CES need not abandon its historic rural foci nor neglect providing strong rural programs, but rather should plan strategically for efficacious approaches to Extension in urban settings (Fox et al., 2017). While Extension has made effort to explore ways to best serve urban audiences (Cuitie & Erickson, 2022), great demand remains to consider the needs of *all* communities it seeks to engage (Burton et al., 2022).

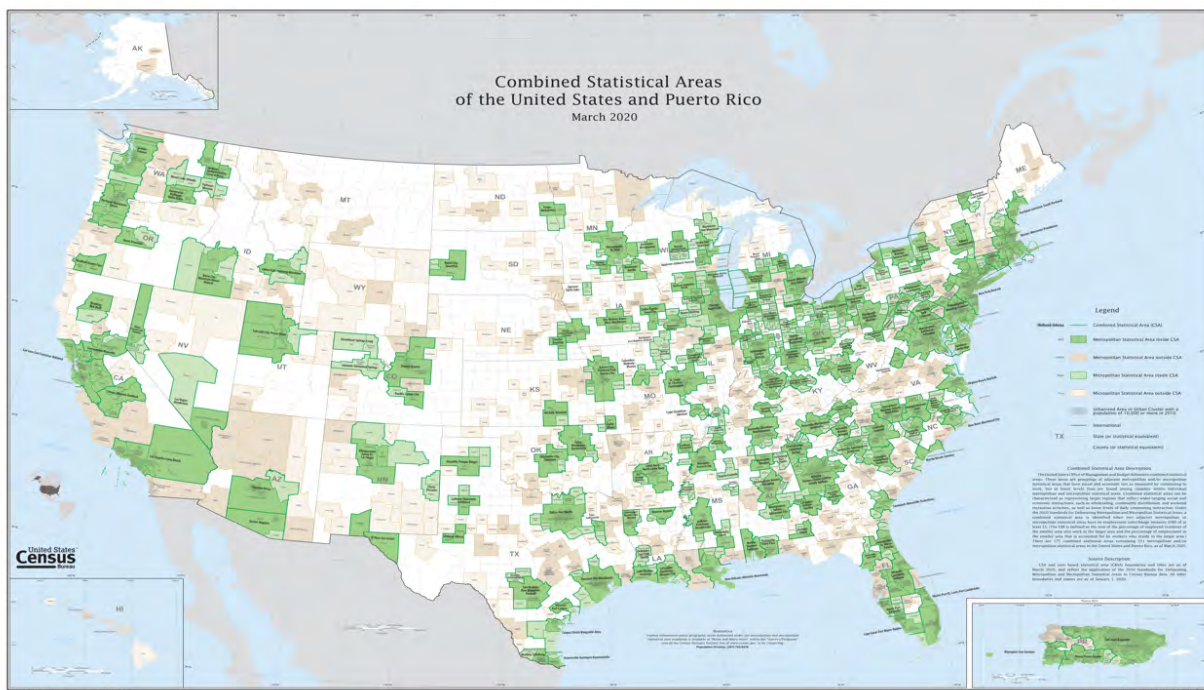
What is Urban Extension?

Extension is well-positioned to address the diverse needs of urban communities (Cuitie & Erickson, 2022). However, disagreement often emerges regarding what *urban* means in the context of Extension programming. Researchers and policymakers often use one of two federal systems to define urban and rural (Isserman, 2005). The U.S. Census Bureau separates the United States with the intent of distinctly differentiating between the two (see Figure 1). Whereas the federal government's Office of Management and Budget (OMB) focuses on the integration of *urban* and *rural* within *metropolitan* and *micropolitan areas* for the purpose of

allocating resources (Isserman, 2005). The U.S. Census Bureau’s definitions are based precisely on population ranges and density. This results in urban-defined areas varying with large populations such as the New York–Newark metro with its 18 million residents and a density of 5,300 persons per square mile to small urban areas, for example, George West, Texas with a population of 2,500, less than three square miles in size, and a density around 850 individuals per square mile (Isserman, 2005). On the other hand, the OMB Rural-Urban Continuum Codes is a classification scheme distinguishing metropolitan counties by the population size of their respective metro areas, and nonmetropolitan counties by this degree of urbanization and adjacency to metro areas (USDA-ERS, 2020). Counties are listed as *metro* or *non-metro* along a population gradient with a corresponding number code. For these reasons, the definition of urban for the sake of Extension programming is complex and differs from state to state. Yet, one-half of the nation lives in urban settings of 500,000 or more (Isserman, 2005), and serving this portion of the nation is an important priority for Extension. For this study, no rigid definition of *urban* was adopted for analyzing Extension programs, rather urban Extension was understood as specific activities and initiatives intended to strategically reach cities and densely populated areas.

Figure 1

Map of Metropolitan Statistical Areas of the United States



Urban Extension Clientele

Urban areas have unique needs sometimes overlooked by traditional Extension programs, necessitating modifications to how Extension operates in these venues (Ruemenapp, 2017). A primary difference between rural and urban audiences is that Extension professionals serving urban communities work with larger and more diverse populations who may not be aware of the

role of Extension. This creates unique challenges less likely to be experienced in rural settings that have been served by Extension for long periods of time (Paulsen, 1973). Fehlis (1992) suggested that urban and rural communities face similar challenges, however, the underlying causes of these issues likely differ within each context, resulting in a unique need for divergent approaches to Extension programming.

Although this study analyzed historical developments in urban Extension broadly, specific emphasis was placed on the 13 southern region states. This focus was due to the region's significant population growth trends over the last decades. For instance, the population in the southern region states grew seven times faster than in the Northeast and Midwest between 2017 and 2019 with Florida, Georgia, and Texas contributing the most to the increase (Freddie Mac, 2021). Rapid population changes in the United States such as the rise of immigrants in the southern U.S. have resulted in Extension often being ill-equipped to meet their needs (Herndon et al., 2013). Even though more focus has been placed on the unique needs of urban populations over time and how to better serve this audience through Extension (Fox et al., 2019), Warner et al. (2017) noted that urban populations remain a largely untapped, diverse, and important sector of potential clientele, but a greater understanding of the phenomenon they represent was needed. For this reason, investigating the approaches to urban Extension program delivery over time may provide important insights into exemplary approaches in urban settings as well as the future of such programming and illuminate potential gaps that urban Extension programs should seek to address.

Purpose and Research Questions

This historical research study's purpose was to analyze the emergence of and events surrounding urban Extension in the United States and to assess the approaches of the 13 southern region states Extension services to providing urban Extension over time. The study included both 1862 and 1890 institutions from each southern region state for a total of 27 institutions. Two research questions guided this study: How did the discussion of Extension programming in urban settings evolve over time? and What types of urban Extension programming occurred in the southern region states over time?

Methods and Data Analysis

The study's research questions were addressed by using historical research methods (McDowell, 2002). According to McDowell (2002), the historical research process involves evaluating and interpreting historical evidence and communicating this evidence through a coherent and consistent account that enhances understanding of the phenomenon. Primary and secondary sources were retrieved by searching database subscriptions and through internet search engine queries. Key search terms for the study included city Extension, metropolitan Extension, urban Extension, urban Extension followed by the name of each of the 13 southern region states, and urban land-grant. Primary sources included Cooperative Extension committee reports, institutional websites, and archives. Secondary sources were peer-refereed journal articles and books on Extension and significant historical figures in the history of Extension. The authenticity and accuracy of findings were examined by applying external and internal criticism, respectively (Johnson & Christensen, 2012). Multiple sources were examined to verify and corroborate the accuracy of our findings (Johnson & Christensen, 2012). Wineburg's heuristic of *contextualization* regarding the evolution of historical documents and the key events such may reveal, especially the issue of *when*, was addressed by establishing a chronological order or

timeline of major urban Extension events in the United States (Johnson & Christensen, 2012). Wineburg's attention to *where*, was acknowledged by noting the urban or metropolitan setting in which significant meetings and conferences occurred regarding the topic of urban Extension (Johnson & Christensen, 2012).

Findings

R.Q. #1: How did the discussion of Extension programming in urban settings evolve over time?

1914 to 1945: Founding of the Cooperative Extension Service through the Great Depression and World War II Era

The period leading up to the formation of a national Cooperative Extension Service is marked by changes in American society, including the aftermath of the American Civil War, the Gilded Age, and the onset of World War I, among other major historical events. The Country Life Commission appointed by President Theodore Roosevelt and led by Liberty Hyde Bailey, dean of the Cornell University College of Agriculture, released a 1909 report detailing the need for investment in rural America and is thought of as influencing the formation of the U.S. Cooperative Extension Service (Ellsworth, 1960). Carlson (1970) maintained that Congress wanted an Extension Service to increase agricultural production so the nation would not have to spend as much on the importation of food for its growing population. It also wanted Extension to help maintain rural ways of life but instead, according to Carlson (1970), Extension, through its focus on improving farming efficiency, actually contributed to American society moving further away from the rural life it was established to maintain.

Leading up to the formation of the Cooperative Extension Service, youth agricultural clubs gained popularity and support from the United States Department of Agriculture [USDA] (Uricchio et al., 2013). By 1919, the structure of 4-H was largely established. A. B. Graham was an early pioneer of Extension from Ohio who saw the importance of youth programs (Fuller, 1985; Gordon & Schultz, 2020). In 1930, Graham is said to have traveled to Washington, DC to lobby for the development of 4-H programs in urban areas (McCormick, 1984). Shortly after the enactment of the Smith-Lever Act of 1914 formally establishing the U.S. Cooperative Extension Service, questions emerged as to what Extension's role would be in cities. A 1937 report from the Extension Director of Washington State University stated that despite the negative effects of the Great Depression on urban areas, "[t]he movement of population from the farm to the city indicates the decreasing attractiveness of farm life. In the past twenty-five years, while the nation's population grew nearly 40 percent . . . the farm population actually declined" (Balmer, 1937, p. 14). A 1939 report on the impact of land-grant universities recognized that the industrial revolution and advances in manufacturing had tipped the balance of population from rural to urban and diminished the need of agricultural manpower in rural communities (Works & Morgan, 1939).

1945 to 1989: Post World War II through the Cold War Era

While the Country Life Commission had identified the shortcomings of rural areas decades earlier (Ellsworth, 1960), scant research had focused directly on the needs of urban areas until 1954 when the American Association of Land-Grant Colleges and State Universities (AALGCSU) Committee on Problems of Urban Educational Extension reported the shift in

population from rural to urban areas (AALGCSU, 1954). This committee surveyed Extension professionals to determine what services were offered to urban communities. It found that Extension in most states was serving urban groups but lacked financial resources for targeting specific urban issues and struggled to adapt traditional, rural-focused Extension programming to meet the needs of urban populations (AALGCSU, 1954). A lack of training for Extension staff serving urban populations was also identified as a challenge. Moreover, the committee reported that only a few states had designated personnel to serve urban populations. This report was one of the earliest efforts to show that unique needs existed in rural and urban settings and specific Extension approaches were needed to appropriately serve each population (AALGCSU, 1954).

In 1965, Emory J. Brown, a professor of rural sociology and Extension at Pennsylvania State University, published one of the earliest articles on urban issues in the *Journal of Extension* which suggested a need for new approaches to providing Extension services to urban audiences (Brown, 1965). Brown (1965) argued that no other organization existed in rural areas to specifically serve rural populations, but that many groups worked in urban settings so Extension must identify its unique value and service purpose in urban communities.

In 1966, the Ford Foundation published a report on urban Extension efforts recognizing that the traditional role of Extension was not sufficient in serving the rapidly changing urban population of the United States (Ford Foundation, 1966). Some of the issues identified in the foundation's report included low income, poor education, inadequate housing, and problems in the environment of urban areas (Ford Foundation, 1966).

In 1968, a joint USDA and National Association of State Universities and Land-Grant Colleges (NASULGC) Extension Committee recommended that Extension increase commitments to urban programming and diversify the range of training offered to Extension professionals to more effectively address problems of the nation's urban areas (USDA-NASULGC, 1968). In 1969, the Expanded Food and Nutrition Education Program (EFNEP) was launched with an emphasis on large urban audiences and provided information to improve health and food safety (NIFA, 2020).

The Urban Growth and New Community Development Act of 1970 outlined a federal policy that emphasized the needs of urban areas (Paulson, 1973). A survey of state Extension administrators conducted in 1973 identified numerous barriers to Extension in urban areas. For instance, personnel not oriented toward urban problems, difficulty adapting to meeting urban needs, the limited research base for urban issues, the extreme diversity of urban populations and needs, a public image of rural and agricultural, and the overwhelming number of people and needs of urban audiences, therefore, making it difficult for Extension professionals alone to address such given their limited time and resources (Paulson, 1973). In accord, Miller (1973) suggested that new models for Extension should be considered and called for a "whole new methodology" (p. 58) for program delivery in urban settings. The model put forth suggested reclassifying county Extension offices as either rural, urban, or metro. Extension professionals in rural offices would continue to provide Extension programs using traditional delivery methods. Whereas, the urban offices would be expected to address the calls for traditional programming when asked, but also take on more diverse roles consistent with meeting the needs of urban clientele. These agents would not deal with a specific subject but rather a broad range of urban

needs and coordinate with on-campus subject matter experts when needed (Miller, 1973). In contrast, the metro model would be an office focused on strategic initiatives and partnerships, the identification of emerging urban needs, and staffed with Extension specialists educated in a specific discipline (Miller, 1973).

In 1981, a report on Extension programs in nine metropolitan areas, including Buffalo, Cincinnati, Cleveland, Columbus, Indianapolis, Milwaukee, Minneapolis, Seattle, and St. Louis, found key similarities regarding program areas but many differences in funding for the programming (Steele, 1981). In 1988, the first Big Cities Extension Conference was held in Minneapolis, Minnesota (North Central Region Urban Conference, 1988). This event was the first annual urban Extension conference and would be the precursor to today's National Urban Extension Conference (NUEC).

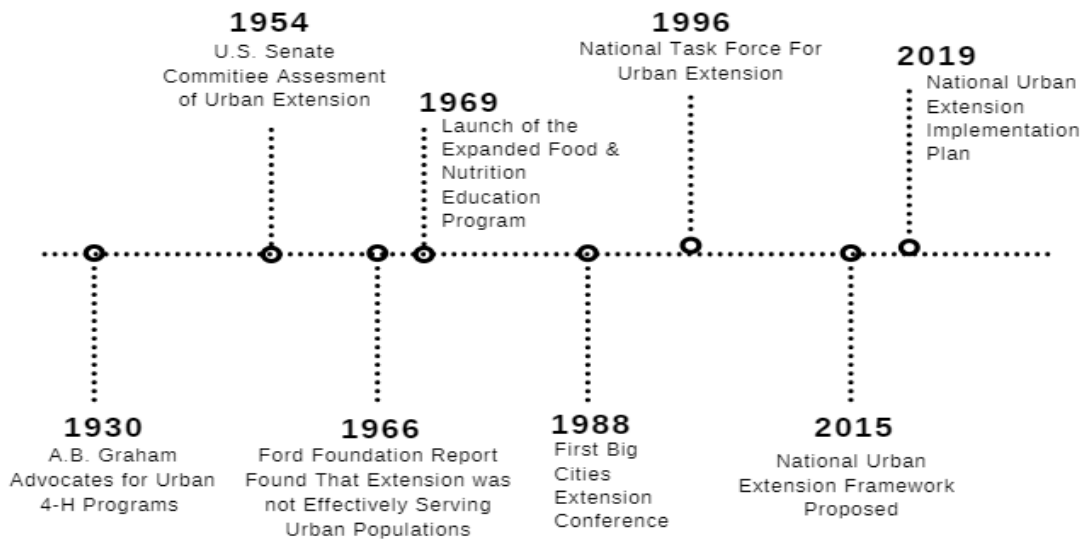
1990s to the Present Day

In 1996, a USDA Extension task force produced a report that outlined a national agenda for urban Extension and conceptualized a strategic framework for Extension programs in urban settings (CSREES, 1996). In 2011, the North Central Cooperative Extension Association facilitated an urban food system symposium to plan for strategic approaches to address urban food system issues. The report developed from this event identified a list of issues related to metropolitan food systems that the Cooperative Extension Service was uniquely positioned to address, as well as opportunities for collaboration on metropolitan food system issues and programming across universities (Taylor, 2011).

A report was created by the National Urban Extension Leaders (NUEL) Network in 2015 that provided a new framework for urban Extension. This framework was approved by the Extension Committee on Organization and Policy (ECOP). As a result, advancing urban Extension became one of ECOP's top priorities (Fox et al., 2017). The National Urban Extension Framework (NUEF) was formally adopted by ECOP in 2019 to fortify the relevance and long-term success of Extension in urban settings. The NUEF offers strategic analysis of urban Extension opportunities through four key considerations identified as 1) *Positioning*: How Extension is positioned at community, regional, state, and national levels; 2) *Programs*: How Extension addresses the multitude of issues and priorities in cities; 3) *Personnel*: How Extension attracts, develops, retains, and structures competent talent; and 4) *Partnerships*: How Extension collaborates to leverage resources for collective impact (Fox et al., 2017). Figure 2 displays many of the major urban Extension events in the United States over time.

Figure 2

Timeline of Major Urban Extension Events

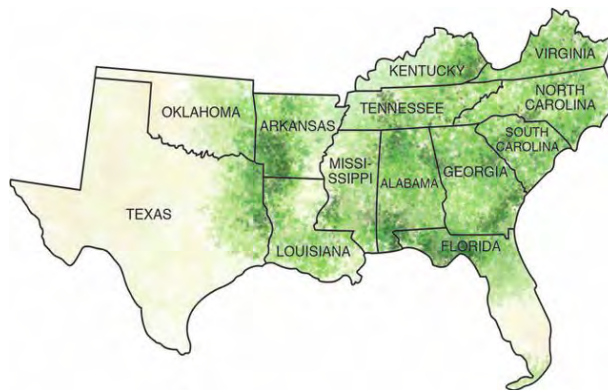


R.Q. #2: What types of urban Extension programming occurred in the southern region states over time?

Most of the urban Extension emphasis was centered historically in the North Central region and in large coastal cities of the United States, but the urban populations of the southern region states are now growing significantly faster than in those areas (Freddie Mac, 2021). A review of all southern region Cooperative Extension Services was conducted, i.e., its 13 member states. Both the 1862 and 1890 institutions of each state were included. Institutions in Puerto Rico and the U.S. Virgin Islands were not part of this analysis though, as U.S. territories, they are considered part of the southern region. It also should be noted that five 1890 institutions were excluded from this analysis because they are not located in one of the 13 southern region states, as determined by the USDA (see Figure 3). As such, 27 land-grant institutions were included in the analysis with Alabama having two 1890 institutions if including Tuskegee University (see Table 1).

Figure 3

Map showing the 13 Southern Region States included in the Study.



Note. Image adapted from USDA Southern Regional Extension Forestry

Table 1***Southern Region Institutions included in the Study'Analysis***

States	1862 Institutions	1890 Institutions
a. Alabama	Auburn University	Alabama A&M University and Tuskegee University
Arkansas	University of Arkansas	University of Arkansas Pine Bluff
Florida	University of Florida	Florida A&M University
Georgia	University of Georgia	Fort Valley State University
Kentucky	University of Kentucky	Kentucky State University
Louisiana	Louisiana State University	Southern University
Mississippi	Mississippi State University	Alcorn State University
North Carolina	North Carolina State University	North Carolina A&T University
Oklahoma	Oklahoma State University	Langston University
South Carolina	Clemson University	South Carolina State University
Tennessee	University of Tennessee	Tennessee State University
Texas	Texas A&M University	Prairie View A&M University
Virginia	Virginia Tech University	Virginia State University

Note. a. Indicates more than one 1890 institution.

An analysis of the 13 states was conducted to highlight key discussions around urban Extension as well as identify specific initiatives, strategies, and activities related to urban Extension programming that had been conducted. Five of the 13 states in the southern region - Alabama, Georgia, Kentucky, North Carolina, and Texas - had developed urban administrative units or districts to group together urban counties for strategic management and the training of personnel. Eight states had no urban units and instead grouped all counties by geographic parameters, including major urban and rural counties together in the same administrative regions or districts. This analysis was not a comprehensive review of all urban Extension activities in each state, but rather a snapshot of key events and activities to improve our understanding of what urban Extension efforts had occurred over time across the Southern United States. Online searches and reviews of University Extension websites were conducted to accomplish this outcome.

Alabama

The Alabama Cooperative Extension Service (ACES) is a unified effort between Auburn University (1862) and Alabama A&M University (1890). The ACES has an urban-focused administrative unit that encompasses the staff of nine urban counties. In 2004, ACES underwent a restructuring that resulted in prioritizing 14 primary programming areas in four core spaces, including agriculture and natural resources, human sciences and community development, urban Extension, and 4-H youth development (Weldon, 2020). Today, ACES provides support to all 67 Alabama counties and has nine designated urban Extension centers (ACES, 2022).

Arkansas

In Arkansas, Extension is comprised of separate Extension programs between The University of Arkansas (1862) and the University of Arkansas Pine Bluff (1890). The University of Arkansas Cooperative Extension Service houses its Extension administrative unit in urban Little Rock, Arkansas. However, no distinctly urban unit for county Extension programming was identified. A 2020 study sought to develop a local definition for urban agriculture in the state and emphasized urban agriculture as small acreage farming within a city's boundaries (Dobbins et al., 2020). A 2021 study recognized the growing importance of urban agriculture in Arkansas and analyzed the perceptions of Arkansas Extension professionals regarding urban agriculture issues, finding that the agents perceived urban agriculture was an important area of emphasis for Extension programming (Dobbins et al., 2021).

Florida

Extension in Florida is operated through Extension systems at The University of Florida (1862) Institute of Food and Agricultural Sciences (UF-IFAS) and Florida A&M University [FAMU] (1890). While no specific urban administrative unit exists for Extension field professionals, urban Extension strategic programming has been made a priority. In 2011, a committee was formed with representatives from UF-IFAS and FAMU. This committee developed a strategic plan for Cooperative Extension in Florida, including a strategic plan for urban areas (UF-IFAS, 2013). In recognition of the growing importance of urban Extension, UF-IFAS Extension developed a strategic plan for Extension in metropolitan regions to improve Urban Extension practices and the lives of Floridians (UF-IFAS, 2016). The strategic plan focused on natural resources, energy conservation, community health, and youth (UF-IFAS, 2016).

Georgia

Extension in Georgia is operated collaboratively but independently between the University of Georgia (1862) and Fort Valley State University (FVSU) (1890). FVSU has Extension offices in 31 Georgia 159 counties (FVSU, 2015). Although the Extension programs offered by FVSU include many subjects of relevance to urban audiences, no specific urban initiatives were identified. The University of Georgia (UGA) Extension has an urban Extension focus through its Center for Urban Agriculture (Bauske et al., 2008). The Center was first developed by the UGA College of Agricultural and Environmental Sciences in 1998 after discussions among faculty, county agents, administrators, and stakeholders envisioning an

effective approach to integrate Extension, research, and instruction to address the needs of urban constituents, and was recognized as an official university center in 2007 (Bauske et al., 2008). The Center initially focused on the delivery of science-based information to urban audiences. However, the Center's mission evolved over time to include program planning, professional development, and training of urban-serving county agents (Bauske et al., 2008).

Kentucky

Extension in Kentucky is operated collaboratively but independently by the University of Kentucky Cooperative Extension Service (1862) and the Kentucky State University Cooperative Extension Program (1890). Both the University of Kentucky (UK) and Kentucky State University (KSU) engage in programming specifically targeting urban audiences and UK has established an urban Extension administrative unit focused on addressing strategic programs and professional development for Extension professionals serving the state's 10 largest cities. In 2013, Kentucky Cooperative Extension hosted an urban Extension forum to explore opportunities to make Extension more successful in serving its urban constituents (Young & Vavrina, 2014). This forum was attended by a diverse group of 69 Extension personnel and ultimately led to establishing the Kentucky Urban Extension Initiative (KUEI) (Young & Vavrina, 2014). A study conducted in 2021 sought to clearly define urban Extension in Kentucky, which also resulted in classifying 13 counties as urban (Hains et al., 2021).

Louisiana

Extension in Louisiana operates through separate Extension programs as provided by Louisiana State University (LSU) (1862) and Southern University (SU) (1890). The SU Extension system is known as the SU Agricultural Center and has a presence in 34 parishes and offers programming and support services in urban-focused areas including a certification in sustainable urban agriculture (SU, 2022). The Louisiana Cooperative Extension Service is the educational branch of the Louisiana State University Agricultural Center [LSU Ag Center] (Hodson, 1998). The LSU Ag Center provides services to all 64 Louisiana parishes on topics addressing the needs of urban clientele. The Ag Center came into being in 1972 when agricultural research and Extension were assigned to a separate campus then known as the Center for Agricultural Sciences and Rural Development (Hodson, 1998). A dissertation study conducted in 1997 assessed the perspectives of Louisiana state legislators toward Extension programs and found that urban legislators were considerably less familiar with Cooperative Extension (Hodson, 1998). The researcher argued that specific efforts should be made to help urban legislators understand the mission and programs of Extension in Louisiana (Hodson, 1998).

Mississippi

A 1964 Mississippi State University institutional report noted challenges to the future success of Extension in Mississippi and identified the expansion of work into urban areas as a priority (Cowie, 1973). Extension in Mississippi is operated through separate Extension programs between Mississippi State University (1862) and Alcorn State University (1890). The Alcorn State University Extension Program supports small farmers, ranchers, and limited-resource audiences from three locations and serves 15 southwest Mississippi counties. Whereas,

Mississippi State University Extension serves all 82 of the state's counties. Though some programming relevant to urban audiences is likely offered, no specific urban-focused programs were identified.

North Carolina

Extension in North Carolina is operated collaboratively but independently through North Carolina State University [NC State] (1862) and North Carolina Agricultural and Technical University [NCA&T] (1890). NC State Extension uses population density to identify urban areas across the state resulting in six urban counties with an average population density that exceeds 750 persons per square mile. One-third of the state's population currently lives in these urban counties and strategic programming is conducted to serve its needs (Feierabend, 2020). NC A&T is also serving urban communities with projects such as leadership programming targeting youth in underserved urban communities (NC A&T, 2020).

Oklahoma

In 1969, Oklahoma State University (OSU) created an urban Extension agent position in Oklahoma City to act as a liaison between the clientele in metropolitan Oklahoma City and the non-traditional Extension departments on its Stillwater campus, including the College of Business, Engineering, Education, and Arts and Sciences (Hannah, 1979). Today, Oklahoma does not have an urban-designated Extension administrative unit, although unique positions have been developed to address issues deemed important in urban areas such as Youth Mental Health, STEM, and Urban Agriculture. Both OSU (1862) and Langston University (1890) have Extension staff located in the Oklahoma City and Tulsa metro areas focused on urban agriculture issues. Oklahoma is the only state with all three types of land-grant institutions. In addition to Oklahoma State University (1862) and Langston University (1890), the College of the Muskogee Nation also has a land-grant charter and is one of the 36 Native American land-grant institutions under the Equity in Educational Land-Grant Status Act of 1994 (Croft, 2019).

South Carolina

Extension in South Carolina is administered independently by Clemson University (1862) and South Carolina State University (1890). Programs serve all 46 South Carolina counties with topics of importance to rural and urban clientele, but no specific urban-focused programs were found. In addition, no urban administrative units had been established.

Tennessee

Extension in Tennessee is operated independently between the University of Tennessee (1862) and Tennessee State University (1890). Both institutions have developed programs of importance to urban clientele, but no urban-specific Extension administrative units were identified. A strategic plan conducted by the University of Tennessee in 2020 identified the increasing use of technology in all aspects of Tennesseans' lives and the need for Extension to evolve to meet the changing needs of its clientele (Hastings et al., 2020).

Texas

Extension programs in Texas are operated collaboratively but independently between Texas A&M University Extension [Texas AgriLife] (1862) and Prairie View A&M University [PVAMU] (1890). PVAMU provides Extension services to 55 Texas counties including program areas of importance to urban audiences such as urban agriculture and other topics (PVAMU, 2022). Texas AgriLife has an urban administrative unit with a program director overseeing nine urban counties in Texas (Texas A&M Extension, 2015). In 1989, the state's Extension administration appointed a task force to study Extension programming in urban areas, resulting in the implementation of an urban initiative for major metropolitan counties in Texas (Fehlis, 1992). The initiative focused on developing urban faculty and innovative educational programs for urban audiences (Fehlis, 1992). In 2005, Texas A&M University Extension hosted the National Urban Symposium on Youth and Family Wellness (Texas A&M Extension, 2005). A number of educational programming efforts have been implemented by Texas AgriLife Extension formerly Texas A&M Extension, and PVAMU Extension to increase Hispanic participation (Saldaña, 2004). One of the most significant programs involved the *Una Vida Mejor* project, as funded by the Kellogg Foundation. This project sought to improve Extension's capacity to serve Hispanic audiences, particularly in urban areas (Saldaña, 2004).

Virginia

The Virginia Cooperative Extension (VCE) service is a unified effort of Virginia Tech University (1862) and Virginia State University (1890). The VCE has five administrative districts arranged by geographic regions. No specific urban administrative unit exists but urban-focused programming is a major priority of VCE. Extension programs in Virginia have seen many changes spurred by the urbanization of communities. A 1999 *Washington Post* article described the changes to Extension programs in the Washington D.C metro area:

Gone are afternoons when 4-H agents helped children ready their cows for the county fair, as are the classes that instructed homemakers on the right way to put up preserves. If you want to pickle some beets, call Martha Stewart. If you want to get down to business in an urban landscape like Arlington, learn money management or ecological landscaping, or get your child involved in activities to learn racial tolerance, call your extension agent. (Smith, 1999, p. 1)

While Extension programs in rural areas have stayed mostly traditional, activities and services in counties such as Arlington, Virginia have evolved, with many of the programs tailored to meet the needs of the area multicultural populations (Smith, 1999). A 2002 *Washington Post* article detailed how budget cuts to Extension were changing the nature of the programs offered and reported that Northern Virginia Extension programs that survived budget cuts were those that reflected the increasingly urban character and diverse needs of Virginians (Jewett, 2002).

Conclusions and Recommendations

Although established largely for the purpose of supporting rural, agricultural communities, the U.S. Cooperative Extension Service has considered the need for Extension programs in urban settings for as long as it has existed (Brown, 1965). Most of the early efforts to develop Extension programs with urban audiences in mind emerged in the Rust Belt region of

the North Central and Northeastern regions of the nation, though examples from across the United States can be found.

The rapid urbanization that marked the nation's 20th century gave rise to discussions of new models of Extension programs that gained momentum in the 1960s. These discussions led to the development of national frameworks and models for urban Extension in the late 20th century and, ultimately, to a unified national framework for urban Extension that emerged in the 2010s. This national focus has led to the creation of urban Extension strategic priorities, programs, and personnel in many states, with the purpose of addressing the needs of urban clientele. The Southern Region states were among the fastest-growing in the nation (Freddie Mac, 2021). Urban approaches to Extension in this region, although disparate and differently organized and administered, during the last few decades have increased and will likely see further development in the years ahead, especially as urban populations expand and diversify further. Recognition of the changes in American communities has positioned urban Extension programming as a priority at the national level (Fox et al., 2017). As Extension systems seek to better engage with clientele, they must adapt their approaches to meet the shifting needs of urban communities. Our understanding of this phenomenon through a historical lens should better prepare Extension professionals to meet these needs and others that will undoubtedly emerge. The highlighting of such may also assist other disciplines in learning where they may better collaborate with Extension to meet the needs of urban communities, including members of the American Association for Agricultural Education.

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Developing Transformational Learning Tools to Increase Systems Thinking Capacity: Implications for Agricultural Education

Abstract

Being able to solve complex challenges facing the food system is an increasingly important capacity for undergraduate students entering into the global workforce. However, curriculum tools to enhance systems thinking in the undergraduate agricultural classroom are limited. The current study explored the use of hypothetical case scenarios related to teaching about the seafood industry to determine the use of these tools as a mechanism for increasing students' systems thinking capacity. The mixed-method study used a survey and focus group debriefs to explore participants' experiences with the transformational learning tool. Results indicated that participants' understanding of and capacity for using systems thinking to reason through complex scenarios increased during the mixed-method educational intervention. Participants stated the experience helped them learn more about their own patterns of thinking. Implications for using hypothetical case scenarios in the agricultural education classroom are explored.

Introduction & Theoretical Framework

Systems thinking, related to complex systems learning, is a popular learning outcome within science and agricultural education (Andenoro et al., 2016; Gilissen et al., 2020). Integrating systems thinking into scientific learning processes can help students use relevant theories and develop problem-solving skills geared toward current global issues, specifically related to the interdisciplinary nature of scientific practice (Blatti et al., 2019). Systems thinking can help students reason about the scientific and socioeconomic, cultural, and political dimensions of complex challenges, harnessing analytical focus toward resolving underlying causes of, rather than surface-level adaptations to, socio-scientific issues (SSIs; Ke et al., 2020; Sadler et al., 2007). SSIs are “complex, ill-defined, critical societal issues that have a basis in science” (Ke et al., 2020, p. 1339), such as climate change and genetically-modified organisms. Many students, however, do not have the skills to reason through issues systemically, leading to a failure of not fully appreciating the complexity of issues (Ke et al., 2020; Liu et al., 2011). The current study addresses the National Research Priority Area #7, Addressing Complex Problems, by exploring curriculum development tools to increase complexity and systems thinking in the agricultural education undergraduate classroom.

One of the primary challenges for instructors implementing SSI-related content, such as systems thinking, in the classroom is a lack of pedagogical tools and professional development competencies to facilitate systems-oriented learning (Ke et al., 2020; Tidemand & Nielson, 2017). While applying course concepts, specifically related to SSIs, to real-world situations can promote diverse thinking leading to more innovative ideas for implementing solutions to complex challenges facing the food system (Blatti et al., 2019; Pauley et al., 2019), few strategies exist for instructors to implement this in the classroom. Systems thinking can be used to scaffold educational concepts, in science and food systems education, to create “a positive, open, and free-thinking learning environment [that] allows students to create and encourages them to take risks as they learn” (Blatti et al., 2019, p. 2853). Making decisions for solutions-generation for SSIs requires evaluating the trade-offs, or comparing the benefits and disadvantages, among potential solutions (Eggert et al., 2013; Sakamoto et al., 2021). Crafting

opportunities for evaluating trade-offs within the classroom can help connect course content with real-world situations to engage students in related decision-making processes (Blatti et al., Sakamoto et al., 2021). One method for creating educational opportunities for such decision making, enhancing both cognitive and affective connections in the learning process, is the use of hypothetical case scenarios (HCS; Ferreri & O'Connor, 2013; Littleddyke, 2008). HCS are a form of choose-your-own-adventure activities that enhance student engagement in the learning process through the gamification of learning (Bechkoff, 2019; Ferreri & O'Connor, 2013; McKim & Torres, 2010). HCS also offers opportunities for students to engage in risk-taking within learning, helping foster creativity in the systems-based learning process (Blatti et al., 2019).

Most research related to SSIs and systems learning in the classroom has focused on the acquisition of content knowledge and alignment with learning outcomes such as understanding scientific concepts, models, and methods of reasoning (Ke et al., 2020; Zeidler, 2014). Fewer studies, however, focus on student learning processes, metacognition, and experiences with learning tools using SSI topics and systems learning environments (Ke et al., 2020). Additionally, there is a dearth of teaching tools to facilitate systems learning for students across educational contexts. The current study presents a mixed-method perspective of undergraduate students' experiences with an HCS, systems-based learning tool to provide insight on the use of systems-based pedagogy in the higher education classroom.

The theoretical framework that guided the current study was transformative learning theory (Mezirow, 1991), which emphasizes the shifts in attitudes, behaviors, and dispositions that result from content-based learning (Mezirow, 1991). Within transformative learning theory, learning is transformative when one uses critical reflection and awareness of their preconceived notions of a concept, restructures their assumptions about the concept, and begins to act according to those newly developed understandings of the concept (Mezirow, 1990). Three elements are central to transformative learning processes: experience, dialogue, and critical reflection (Taylor & Cranton, 2013). Experience serves as the foundation for meaning-making and critical reflection, often through a disorienting dilemma – a “personal crisis, triggering event, or experience [that] challenges an individual’s belief structures” (Boyer et al., 2006, p. 358). Through dialogue, participants can be exposed to other experiences or perspectives that helps critically question underlying assumptions that can act as barriers for sustainable solutions for complex issues (Mezirow, 2012; Yukawa, 2015). Critical reflection continues the learning cycle, specifically through questioning one’s guiding assumptions they have constructed through their own experiences, perspectives, and beliefs (Yukawa, 2015). The overarching goal to transformative learning theory is facilitating change through a disruptive event to help students or other learners critically examine their beliefs and reconstruct those beliefs through dialogue and reflection to ones more conducive to effective future actions (Yukawa, 2015).

Transformative learning has been implemented related to food systems and agricultural content (Brown et al., 2022; Foster et al., 2014); however, specific learning tools for facilitating the transformational experience and incorporating systems thinking have been limited. Yukawa (2015) explored the use of transformational learning strategies to enhance students’ capacity to deal with complex, wicked problems, or problems that occur in complex adaptive systems in which causal relationships among actors and elements in a system are difficult to identify due to their interdependent and interactive nature. Thus, there is a need to explore pedagogical strategies for facilitating transformative, systems-level thinking for students in the higher

education classroom. New research methodologies and pedagogical strategies are needed to explore transformative learning (Taylor & Cranton, 2013), and the current study aims to add to the literature by using HCS in a transformative learning context, using scenario-based learning to facilitate critical reflection, dialogue, and empathy through the construction and experience of exploring an HCS. The authors explore how HCS can act as a learning tool to mitigate cognitive dissonance arising from a disorienting dilemma and use structured dialogue from the instructor to help students arrive at a resolution for SSIs from a systems-thinking perspective.

Purpose & Research Questions

The purpose of this study was to explore the educational potential of HCS when undergraduate students are learning systems thinking content from a transformative learning perspective. Three research questions guided the study: 1) What responses did participants provide for each hypothetical case scenario?; 2) How did participants navigate the hypothetical case scenarios from a systems-thinking perspective?; and 3) How can the hypothetical case scenario method serve as a transformative learning tool?

Methods

The researchers implemented a mixed methods approach in which they first distributed a quantitative survey instrument with identical systems thinking-based HCS, followed by focus group sessions to debrief with participants (Greene, 2007). Participants in the study were undergraduate students enrolled in courses within the University of Georgia College of Agricultural and Environmental Sciences. This study was part of a larger research effort to understand undergraduate students' systems thinking abilities and environmentally conscious consumption values (see Sanders et al., 2022).

The topical area for the HCS used in the study was the impact of human activities on marine ecosystems. Seafood as a food source has the potential to help sustainably feed a growing global population and provide economic benefits; however, there are social challenges emerging that may inhibit sustainable food production and distribution, including lack of trust, perceived risk, and competing interests between stakeholders at local, regional, and global levels (Mazur & Curtis, 2006). The human dimension of environmental issues within marine coastal ecosystems presents significant risks to environmental sustainability, with activities such as overfishing and the contamination of marine ecosystems impacting global food security, climate patterns, weather events, agricultural systems, and coastal flooding (Hamilton & Safford, 2015; Intergovernmental Panel on Climate Change, 2007; McLeod & Leslie, 2012; Rees et al., 2013). In addition to environmental consequences, these disruptions have aesthetic, recreational, and economic impacts on those living near or within coastal ecosystems (Hamilton & Safford, 2015). As the public increases their awareness around the impacts of the seafood industry, the industry has begun adopting more sustainable standards for production (Belton et al., 2009). With growing public influence on the agenda of science, technology, and industry (Fensham, 2014), students must have the skills to critically engage with SSIs to increase their efficacy in problem solving and generating solutions from an interdisciplinary perspective to enhance sustainability across food system contexts (Onwu & Kyle, 2011; Ruth et al., 2018; Skladany et al., 2007; York et al., 2019).

Instrument Development

A survey instrument was distributed to participants through the Qualtrics online survey platform. The instrument contained three HCS, two Likert-type scales in the form of matrices, and demographic questions. For the purposes of this study, only the HCS and demographic questions were used. First, three systems thinking archetypal HCS were presented to each participant throughout the survey. In each HCS, the participant was presented with a primary scenario and asked to choose between two options to address the scenario described. Each participant made their primary choice, then they were directed to one of two possible branched primary outcomes. The two primary outcomes provided a description of the events that took place because of the primary choice and subsequently presented them with two secondary choices. Once the participant selected a secondary choice, they received a description of their final scenario outcome. Because two sets of secondary outcomes were available per primary outcome, there were a total of four possible final scenario outcomes for each HCS. The scenarios were presented in a random order within the survey instrument for each participant in order to reduce potential bias introduced through the influence of one scenario on another throughout the survey process. An example of the scenario organization is shown in the results section.

The first HCS presented a case detailing select issues surrounding Atlantic Cod decline and its effect on coastal communities, drawing upon details from real-life cases of this issue (Brodwin, 2015; Cudmore, 2009; Food & Water Watch, 2010). Researchers modeled this HCS around the tragedy of the commons archetype that frequently arises in systems thinking analysis, as defined by Rutherford (2019). The second HCS dealt with an oyster operation looking to expand but faced with the potential of detrimental environmental impacts if they remain in their current location. Employing Rutherford's (2019) fixes that backfire archetype, this HCS also contained details from real events (Kraft, 2017; Petrolia & Walton, 2018; Sink et al., n.d.; Tallis et al., 2009). Finally, the third HCS – modeled using the principles of Rutherford's (2019) accidental adversaries archetype and real-world events (Baynes, 2021; Coral Reef Alliance, 2021; Dance, 2019; National Ocean Service, 2021; Sustainable Travel International, 2019) – presented a case in which a community planning commission was faced with choosing between investment in the local tourism industry or the local fishing industry. Following completion of the HCS, participants answered demographic questions. Participants were asked to self-identify their age, gender identity, race/ethnicity, college of enrollment within the University of Georgia, classification as a student by year in a program, the rurality of the community in which they grew up (rural, suburban, or urban), and if they grew up in a coastal community following the archetypal scenarios.

Before survey distribution, a panel of experts with expertise in natural resources, agricultural education, and extension education reviewed the instrument for face and content validity. Experts in agricultural leadership and program evaluation reviewed the focus group protocol (detailed below) for face and content validity. A pilot test was conducted with graduate students in the University of Georgia for both the quantitative and qualitative instruments. Researchers adjusted the protocol according to feedback from both the experts and the graduate students.

Researchers developed a focus group protocol to give participants an opportunity reflect upon and discuss with peers the outcomes of each scenario they experienced in the HCS portion of the quantitative survey instrument. Questions within the focus group protocol were each associated

with one systems archetype and its HCS in the quantitative survey instrument. To begin discussion of each individual scenario, a moderator provided a brief definition of the systems thinking archetype in the HCS. Participants were asked to raise their hands to indicate which final outcome they selected in the scenario at hand. Then, participants were asked if, with their newfound knowledge of different possible results, how they went about making their decisions within the HCS. Once participants had the opportunity to discuss this question with their peers, the moderator passed out a printed version of the scenarios to show participants the different possibilities of primary and secondary outcomes. One minute after receiving the handout, the participants were asked what they expected to happen, how those expectations differed from what played out in the scenario, and now that they have seen the whole scenario, would they make different choices. This process was repeated for each scenario. After all scenarios were discussed, the moderator asked participants to reflect upon and summarize within a sentence their experience with both the quantitative survey instrument and the focus group session. The moderator called each participant by name to provide a turn for their response to this question.

Data Collection and Analysis

Data collection for the quantitative survey instrument and focus group sessions were conducted throughout various sessions to reach a wide variety of undergraduate students within College of Agricultural and Environmental Sciences courses from November 10, 2021, to April 20, 2022, based upon the availability of time in courses for the focus group sessions. Participants were advised as to the study's voluntary nature and that declining participation would have no effect on their class grade or standing and completed a consent form upon entering the classroom. The study was approved by the University of Georgia Institutional Review Board (Protocol # 00004479).

When participants arrive in the classroom, researchers asked participants to sign in using an identification number sheet. Then, participants were randomly assigned into focus groups, with the goal of eight to 10 participants per focus group session. If classes were held in a hybrid format to align with COVID-19 protocols, participants who attended the class virtually were randomly sorted into focus groups accordingly. If the class had an enrollment of 10 students or fewer, only one focus group session was facilitated for the entire class. Researchers presented a short overview of what the focus group sessions would entail and then provided participants with a sheet of paper that contained a unique identification number for the survey instrument, a room assignment (if needed), and a section for recording the outcome of each HCS. This sheet was used for participants to provide their identification when completing the survey instrument and for their personal reference throughout the focus group. Following the dissemination of the identification sheets, focus groups followed their moderators into designated rooms to begin their individual sessions. Each focus group room contained eight to 10 participants. Participants in each focus group session were given adequate time to complete the Qualtrics survey instrument and record any reference information about their results.

Following survey completion, participants engaged in focus group sessions, the qualitative portion of the mixed methods study. Designed to understand individual and group experiences and opinions about a specific phenomenon through group discussion, focus groups utilize group interaction to gather data (Kitzinger, 1994). During focus groups, participants listen to the responses of others and expanded upon those comments to extend the commentary beyond that

of their original responses, allowing opportunity for participants to express their individual opinions while considering that of others (Patton, 2014). On average, focus group sessions lasted 45-60 minutes each. Some focus group sessions were shorter based upon the length of class periods, with a shorter class period serving as a limitation because researchers were challenged to rush discussion for the sake of addressing all questions in the moderator's guide. A total of 12 focus groups were conducted. In three of the classes, participant attendance was large enough that three concurrent focus group sessions were conducted. Each focus group session had at least one notetaker one moderator who used the same moderator guide throughout the session to facilitate the conversation.

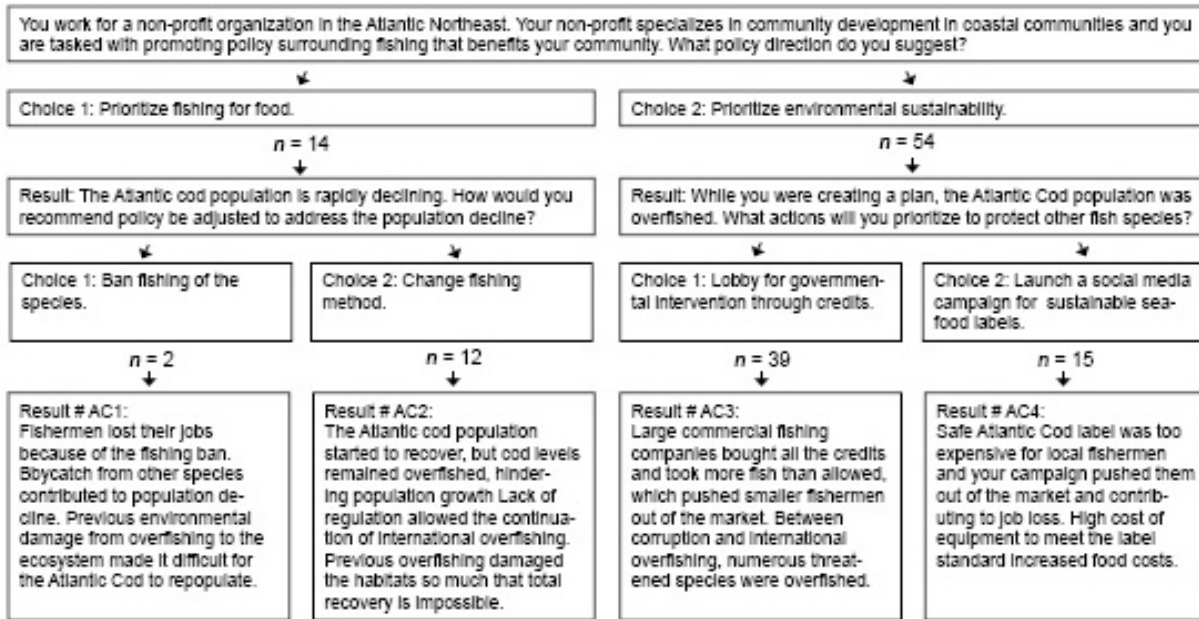
Focus group data were transcribed verbatim and then uploaded to MAXQDA qualitative analysis software. Researchers used an inductive coding approach and the constant comparative method for analysis (Glaser & Strauss, 1967). Themes were identified within the data *in vivo* rather than from predetermined theory (DeCuir-Gunby et al., 2011). Two authors coded the data for overall gestalt followed by axial coding generate themes connecting across the 12 focus groups (DeCuir-Gunby et al., 2011). The two authors then created a codebook to document the development of and agreement between codes (DeCuir-Gunby et al., 2011), followed by peer debriefing with the whole research team to enhance the trustworthiness of the data (Lincoln & Guba, 1985).

Sixty-eight students participated in the study. More than half of participants self-identified as female ($n = 47$, 69.1%) and White ($n = 55$, 80.9%). Participants also identified as Black/African American ($n = 8$, 11.8%), Hispanic/Latinx ($n = 4$, 5.9%), and Asian ($n = 2$, 2.9%), while one participant self-described as Middle Eastern (1.5%). Participants' ages were 18 ($n = 3$, 4.4%), 19 ($n = 15$, 22.1%), 20 ($n = 14$, 20.6%), 21 ($n = 16$, 23.5%), 22 ($n = 13$, 19.1%), 23 ($n = 6$, 8.8%), and 24 ($n = 1$, 1.5%). All undergraduate classifications were represented by participants as follows: first-year ($n = 4$, 5.9%), sophomore ($n = 12$, 17.6%), junior ($n = 25$, 36.8%), senior ($n = 24$, 35.3%), and other ($n = 2$, 2.9%). When asked what type of community in which they spent the majority of their formative years, 7.4% ($n = 5$) of participants selected urban, 48.5% ($n = 33$) selected suburban, and 44.1% ($n = 30$) selected rural. Additionally, more than half of participants did not grow up in a coastal area ($n = 57$, 83.8%) and had no dietary preferences or restrictions ($n = 51$, 75.0%). Other dietary preferences included pescatarian ($n = 1$, 1.5%), vegetarian ($n = 5$, 7.4%), shellfish allergy ($n = 1$, 1.5%), and other ($n = 7$, 10.3%).

Results

Results used to answer the first research question were derived from the quantitative portion of the study and are presented below. Frequencies for the tragedy of the commons scenario (Atlantic Cod) indicated a majority of participants prioritized sustainability ($n = 54$) over fishing for food ($n = 14$) at the first choice stage. Based on the four potential outcomes in the secondary choice stage, most participants ($n = 39$) selected lobbying for governmental credit systems as their preferred intervention within the HCS (see Figure 1).

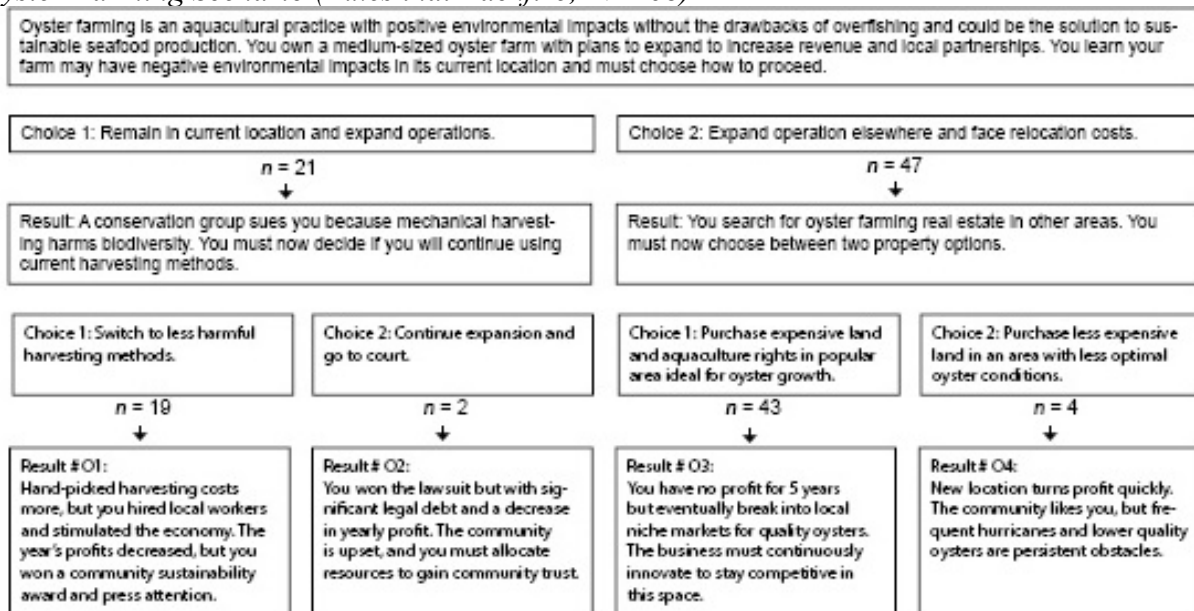
Figure 1
Atlantic Cod Scenario (Tragedy of the Commons; N = 68)



Note. Adapted from Brodwin (2015), Cudmore (2009), and Food & Water Watch (2010).

The second scenario, fixes that backfire, demonstrated participants' decisions related to moving or expanding an oyster farming operation facing environmental and economic impacts. At the initial stage, the largest number of participants ($n = 47$) chose to expand their operation and face economic costs in order to prioritize the environment. At the second-choice stage, the majority of participants decided to prioritize the quality of their product by purchasing expensive land primed for oyster farming ($n = 43$), considering both the long- and short-term economic impacts of their decision (see Figure 2).

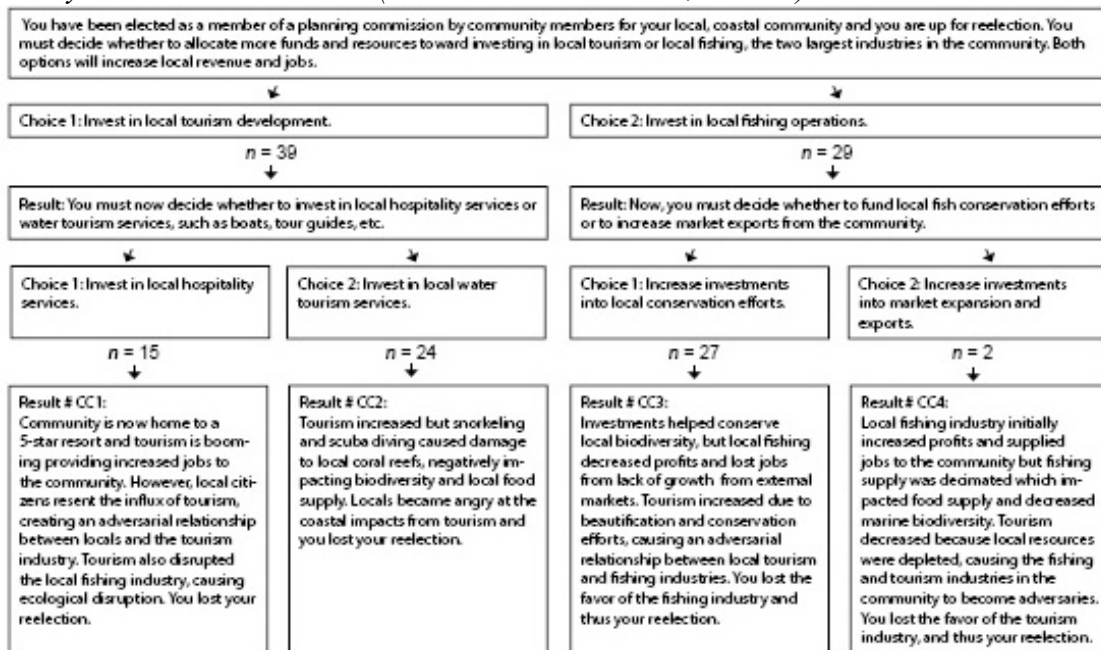
Figure 2
Oyster Farming Scenario (Fixes that Backfire; $N = 68$)



Note. Adapted from Kraft (2017), Petrolia and Walton (2018), Sink et al. (n.d.), and Tallis et al. (2009).

The last scenario, accidental adversaries (see Figure 3), presented a decision between investing in local tourism or the local fishing industry. At the first-choice stage, more participants chose to invest in local tourism ($n = 39$) than in local fishing operations ($n = 29$). At the second-choice stage, many participants who chose tourism investment elected to invest in local tour guide training and tourism services ($n = 24$), while the majority of those who chose local fishing operations at the first stage elected investment into local conservation efforts ($n = 27$).

Figure 3
Community Commission Scenario (Accidental Adversaries; $N = 68$)



Note. Adapted from Baynes (2021), Coral Reef Alliance (2021), Dance (2019), National Ocean Service (2021), and Sustainable Travel International (2019).

Navigating the Hypothetical Case Scenarios from a Systems-Thinking Perspective

During the focus group sessions, participants were given descriptions of the underlying archetype for each scenario (tragedy of the commons, fixes that backfire, and accidental adversaries), and subsequently provided an opportunity to respond to each scenario. Five themes were identified related to systems thinking in participants' responses: *methods for reasoning through scenarios*, *surprise and frustration at outcomes*, *understanding of and confidence in choices*, *evaluating systems-level consequences*, and *thinking through systems complexity*.

Participants used various methods to reason through the scenarios, one being thinking in *long-term rather than short-term mental frameworks*. For example, one participant in FG9 explained their reasoning for the tragedy of the commons scenario: "I prioritiz[ed] sustainability because in the long run that would last longer than prioritizing feeding the population." Another participant explained, "compared to the other [choices], that's probably the better choice maybe even though

you would take the upfront like relocation cost, I think it would pay off in the long run and you wouldn't hurt the local environment" (FG5). Other participants made decisions based on the appropriateness of the solution for the audience: "I [...] went the fishing limit route [for the tragedy of the commons scenario], because not all of these fishermen are going to have social media to view the campaign that they're trying to get advice" (FG11). Finally, several participants described their decision-making process as trying to minimize negative outcomes within each HCS. For the accidental adversaries scenario, one participant in FG5 said, "I expected there to be more traffic with the environment. I know it would cause a little bit damage maybe not as much as it as is explained here."

Participants also expressed surprise and frustration at the outcomes of the scenarios. Several participants expressed *surprise at there being no correct*, or "winning" (FG2), *option*. Moving through the scenarios, participants realized that "every scenario has its downside – that's what surprised me" (FG2). Other participants were frustrated with this non-linearity, saying, "[in the accidental adversaries scenario,] all the choices make someone angry and you always lose your campaign, there's no win here" (FG5). Some participants experienced *unmet expectations* in their decision-making: "I [would] still choose what I chose, but I'm sad when you know what happened. I made those decisions. I thought that sustainability will always work through [...] but it doesn't work out" (FG11).

Other participants stated, knowing what they knew know about the results, they would change their choice: "Knowing all of the answers now, I'd rather have a nice environment than to have another [touristy] beach somewhere, so that's what I would've done" (FG10). The scenarios provided reflective opportunities to discuss unintended consequences from decisions after the systems thinking debrief. One participant reflected:

When I prioritized environmental sustainability, I thought that it was going to be the right choice, or it was going to have a good ending. But sadly it was talking about how corruption international overfishing outnumbered, or threatened the species that were being over fished. That just showed me how [...] things that you won't plan for also go wrong. [In the fixes that backfire scenario,] the lobbying campaign that I chose, [...] it's more than that, it's also having other government things to make sure other smaller companies are being bought out, so that other things are considered than just a typical, one size fits all type situation to cover up the issue of at hand. (FG9)

Within the third theme, *understanding of and confidence in choices*, participants had various reactions to navigating the decision-making process, leading to different learning outcomes about their own ways of thinking. Two subthemes were identified that categorized participant responses: *justification of choice* and *comparing outcomes*. Participants provided several examples of the justification of their choices. Related to the oyster farming scenario, a participant in FG11 outlined their decision process:

I chose to remain in the same location on that first choice because the conservation green lighted it. I figured I'd go ahead and try it and until something new arose instead of trying to preemptively change my mind. Then when something did arise,

I chose to go ahead and cut back on those detrimental actions to preserve the environment. I had pretty good outcomes with [that choice].

Other participants were confident in their choices and justified their decision through comparing the various outcomes. A participant in FG8 stated: “I [figured] I would face more cost in the beginning, but that’s a risk you have to take in a business [...] Making those expensive choices set me up for success in the long run.”

Participants engaged in different techniques to *evaluate systems-level consequences*, the first being *comparing hypothetical with real-world challenges*. One participant explained, “in a mythical world, yes, I would relocate, but in the real world who knows what would’ve been my best option in terms of finances and everything” (FG10). Other participants evaluated *tradeoffs* between economic prosperity and environmental sustainability: “it’s difficult to realize both environmentally sustainable fishing practices and doing beneficial business” (FG10). Participants also explored systems-level consequences through evaluating various risks associated with each option in the HCS. A participant in FG2 explained their reasoning through the decision-making process:

I [thought,] I’m going to just take the risk of relocating. When it came to the other options, I’d much rather pick high quality over something lower [...] So I just want what’s best and then I’m going to assume the consequences of my actions [...] It’s just a risk of getting to a higher level, there’s always going to be a risk.

Overall, participants prioritized sustainability, economics, or the community in their decision-making process. Some participants relied on their backgrounds and previous experiences to make their choice:

I came from a small town. The people that ran for office were people who grew up there. They wanted the best for the community. I lost reelection [in the HCS] but it doesn’t bother me because I did what I thought was best for the community. (FG6)

Other participants prioritized sustainability, stating “I opted for the environmentally safe one” (FG 6), “I tried to keep sustainability in mind when making those choices” (FG7), and “I wish I had chosen to focus on sustainability [...] since the environment’s damage was permanent” (FG 4). Evidence of participants prioritizing economics included statements such as “I was just thinking in terms of money” (FG7), “I chose to purchase more expensive land. I kind of figured obviously lose profit, but if you purchase more expensive land and just work harder, you’ll make your money back” (FG2), and “I’d rather have top quality oysters and sell them, make a profit on those instead of giving lower quality oysters, which my business can again suffer” (FG6).

Finally, the fifth theme was *thinking through systems complexity*, where participants *imagined improvements* to the scenarios, complexifying potential solutions, and *recognized the unintended consequences* of decisions. Recognizing the inherent limitations of only having four choices, participants dialogued about what they would change to make their result more suitable for a variety of stakeholders. One participant explored a third possibility not presented in the scenarios: “Out of those two choices, there could’ve been a third choice that might’ve been a better option” (FG1). Another stated,

I feel like something [...] that might be interesting is if we wind up with result [increasing investments to local conservation efforts (Figure 3)], there's room for fishermen to move into tourism. There's still room to have your own business and make your own money. Maybe you start charging fishing boats [tours ...] or something. (FG11)

Related to *unintended consequences*, one participant reflected, "in the end, everything will have a downside. Whatever decision we make, you just want to do good, do what's best, what you think is best" (FG2). Another participant mused, "I realize that sometimes [having] a good heart and good intentions doesn't always have positive consequences, and [that] made [me] realize how many unintended consequences were coming from every action that we 'chose'" (FG9).

Hypothetical Case Scenarios as a Transformative Learning Tool

Four themes were identified to provide evidence for using HCS in a transformative learning context: *using previous knowledge and experience*, *experiencing difficulties and confusion*, *developing new ways of thinking*, and *experiencing positive learning outcomes*. Several participants described how they used their previous experiences and existing knowledge to help them choose an option in the HCS. One participant explained, "[my choice] has to do with the fact that I grew up in Las Vegas. I was immersed into tourism culture. In my head it didn't bring benefit. [...] I just figured community-based [industry] might be better" (FG6).

Other participants *experienced difficulties and confusion* in the decision-making process, emulating a disorienting dilemma. Often, the disorientation came from pedagogical strategies that were new to participants: "I feel just because we are in school I expect there to be a 'right' answer, so sometimes it's a little frustrating because you're trying to get to the right answer and everything's wrong" (FG7). Other participants described how the HCS helped them develop *new ways of thinking* or to think about their cognitive processes differently. Many reflections came from perceived differences between the real world and what is learned in the classroom: "[this activity] was very helpful to see that, our actions could have drastic consequences. There's rarely a right or correct answer when it comes to our choices in life outside of a classroom" (FG6). Another participant explained what they learned about deficits in their own thinking: "I learned I did not realize the trickle-down effect of potential choices" (FG10).

Overall, participants felt the HCS activity had *positive educational outcomes*. When asked to describe the HCS experience, one participant stated, "I feel like it was educational and I really like how this study is discussion-based because you're able to see other people's choices and how their backgrounds can affect their choice-making" (FG6). Another participant described the activity as "very thought-provoking and informative" (FG3). The discussion-based setting of the HCS activity was a key component appreciated by participants: "I think it was interesting to hear everyone's perspective and opinions, because it emphasizes the fact that your opinions are [influenced by] where you come from, who your family is, where you live, and [your] background" (FG2).

Conclusions and Recommendations

Overall, results indicated the HCS activity was an impactful learning tool for increasing

participants' capacity to engage in systems thinking around SSIs. Participants in all focus groups were highly involved in discussions and debriefs of the HCS, leading to generative dialogue and exposure to others' perspectives and experiences. For many participants, the HCS was also their first time exposed to educational content around seafood and coastal industries. HCS may serve as an engaging strategy for introducing new, complex scientific topics into the classroom. Quantitative analysis of the HCS choices revealed that higher numbers of participants were likely to choose environmental sustainability, as exhibited by the popularity of the first choices leaning toward environmental sustainability in the tragedy of the commons and fixes that backfire scenarios. Qualitative analysis of focus group reflections emphasized the complexity of participants' decision-making processes and allowed them to exhibit knowledge of complex topics beyond environmental sustainability, even when the content area was unfamiliar. Participants exemplified components of systems thinking in their decision making, specifically evaluating tradeoffs between the three legs of sustainability (economic, social, and environmental) as well as reflecting on unintended consequences that arose from those decisions. HCS, through the digital experiential setting, as well as through group dialogue, exposes students to others experiences, helping them "subjectively experience and share in another person's psychological state or intrinsic feelings" (Taylor & Cranton, 2013, p. 43). Through moral conflicts and frustration arising from the HCS, students can engage in structured, safe dialogue, that enhances holistic learning outcomes related to SSIs.

Despite positive results, there were a few limitations of the study. First, due to the authors' need to use an educational setting as an intervention, they relied on convenience samples of students enrolled in courses within the college of agriculture to recruit participants. Thus, findings are exploratory and should not be generalized beyond the sample. An additional limitation was that the HCS were implemented as a one-time intervention in each of the five classes in which participants were enrolled. The three primary authors were not instructors of record for the courses and were unable to examine the use of HCS as a transformative learning tool across a whole semester. However, results from the single intervention suggest HCS have the potential to foster systems thinking, especially from a transformative perspective through introducing a disorienting dilemma, encouraging dialogue, and constructing reflection about metacognition. Future studies could examine the use of HCS to explore students' systems thinking and transformative learning over a longer term, replicating not only the HCS presented here but also adapting HCS to other educational topics within science education. Measures of impact could incorporate both quantitative scales to measure systems thinking capacity in addition to reflection and group dialogue. HCS as a transformative teaching tool has the potential to leverage SSI education, specifically relating to complex issues. Agricultural educators have a responsibility to contribute to a sustainable future, and through educational strategies such as HCS, these educators can help students contextualize human actions as integrated within the environment (Blatti et al., 2019) and how their actions and decisions can have ripple effects far beyond their situation.

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Evaluating Youth Leadership Development of 4-H Foods and Nutrition Program

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Abstract

Developing leadership skills within youth happens over time within a program. 4-H is an ideal program for fostering an environment that allows youth to develop leadership skills. However, how leadership skills develop is still missing. Specifically, core components of a program that foster leadership needs to be identified. Our study sought to investigate the core components (mentor access, authentic opportunities, motivation, and mastery) of the 4-H Foods and Nutrition program to identify how leadership was fostered. These four core program components were identified based on Redmond and Dolan's (2016) youth leadership development conceptual model. Data were collected through a questionnaire sent to Texas 4-H members in the food and nutrition program. The findings revealed that these core components simultaneously foster leadership development. Also, a participant's duration in the program was positively associated with the core components relevant to leadership development. Therefore, we recommended that 4-H extension agents should design programs with these key components and encourage program duration in youth to gain valuable skills.

Introduction

Participation in youth programs can be influential in a young person's life by providing ideal scenarios for leadership to be developed (Witt & Caldwell, 2018). The positive association between the duration of adolescents' involvement in youth programs and productive developmental outcomes has been discovered in previous literature (Ayala et al., 2022; Lynch et al., 2016). The 4-H program, as a trademark youth program that serves more than six million youth every year (4-H, 2021), has continued to strive for opportunities to promote youth leadership skills (Powell et al., 2022; Worker, 2014). According to Lerner and Lerner (2013), youth participation in 4-H activities offered meaningful leadership opportunities, positive relationships with adults, and critical life skill-building activities.

Texas 4-H Foods and Nutrition program give youth an opportunity to grow their skills in preparing nutritious foods and adopting healthy eating habits. These learning experience can help youth reduce the risk of chronic diseases and poor nutrition in adulthood (Texas 4-H, 2021), as childhood chronic diseases cause serious health issues in the United States. Importantly, the 4-H Foods and Nutrition participants develop youth leadership skills by attending activities including project meetings, workshops, tours or field trips, food demonstrations, cooking schools, or career shadowing. These activities give youth authentic chances to build their leadership skills. Opportunities available can include assisting their county Extension agent, assisting a volunteer,

mentoring other 4-H members, coordinating community service activities related to food and nutrition, and presenting to stakeholders.

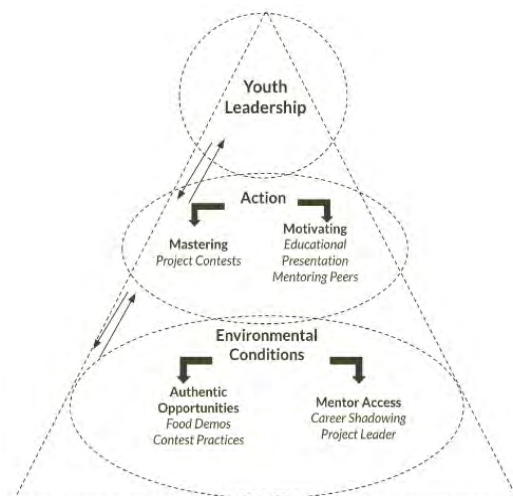
The 4-H Foods and Nutrition program offers participants an opportunity to develop leadership skills as well as a chance to show off leadership skills in a real scenario. Youth participants can learn and practice positive behaviors related to food and nutrition (Diehl et al., 2010). By looking into previous literature, a gap revealed the need for understanding what specific components of 4-H programs foster leadership development. By addressing this gap, practitioners can understand the specific components of developing leadership and guide them in designing leadership activities for youth. Also, these activities can foster youth leadership development from a variety of learning experiences.

Literature Review & Conceptual Framework

The youth leadership development conceptual model development by Redmond and Dolan (2016) identified three sections (skill, environmental conditions, action) that youth go through to develop leadership skills in the relevant context. The skill section emphasizes the importance of skill-building, which plays a critical role in evolving youth into leaders (Northouse, 2004; Redmond & Dolan, 2016; Van Linden & Fertman, 1998). The environmental conditions section focuses on providing authentic and genuine experiences for leadership practice and having direct access to helpful mentors who can give guidance to the youth (Redmond & Dolan, 2016). This is aligned with Bronfenbrenner's (1979) idea that the ecological context in which young people develop should emphasize the importance of supportive environmental conditions to allow growth in these individuals. The action section emphasizes the necessity of action for leadership development to occur. Action involves motivating others to be a part of a common vision and to master at least one new skill set (Redmond & Dolan, 2016). The intertwining of skill development, environmental conditions, and commitment to action is essential to foster youth leadership development (Redmond & Dolan, 2016). We used the Youth Leadership Development conceptual model developed by Redmond and Dolan (2016) to guide our study (Figure 1) and developed the 4-H Foods and Nutrition Leadership Development conceptual model. The model integrates a strong theoretical foundation with important elements from previous literature on youth leadership development.

Figure 1

Conceptual Model Applied in 4-H Foods and Nutrition Program



The skill section recognizes youth personal strengths in collaboration, communication, and socioemotional competencies as foundational for youth continuous development in these skills and in leadership (Redmond & Dolan, 2016). The environmental conditions section includes authentic opportunities and mentor access, both of which ensure contextual resources for youth leadership development during the food and nutrition program (Redmond & Dolan, 2016). Authentic opportunities are illustrated through youth use of real ingredients, utensils, equipment, and food materials to make nutritious meals (Kahn et al., 2009). Additionally, during the learning experiences and competition practices, youth interact closely with adult mentors (Godshalk & Sosik, 2007; Sosik & Godshalk, 2000). Supported by authentic opportunities and helpful mentors, youth will be able to use their skills in a genuine way to exhibit the competencies obtained (Redmond & Dolan, 2016).

The last section of the model is commitment to action, which includes mastery and motivation (Redmond & Dolan, 2016). Leadership development in the food and nutrition program allows for mastery by providing youth positive competition opportunities (Coyle, 2009). Food Show, Food Challenge, Food and Nutrition Quiz Bowl, Record Book, and Educational Presentations represent various activities youth can participate in to demonstrate their mastery of foods and nutrition competencies. Quality performance in these competitions requires youth long-term persistence in their learning and program engagement. To succeed in competitions, youth have to be motivated to develop their competencies constantly (Coyle, 2009), as reflected in their striving to become role models and leaders among peers. The Youth Leadership Development Conceptual Model (Redmond & Dolan, 2016) is clearly reflected in the operation of the 4-H Foods and Nutrition program.

Purpose and Objectives

The purpose of this study was to investigate the core program components of 4-H Foods and Nutrition program to identify how leadership is fostered. Our study aligned with Priority 5: *Efficient and Effective Agricultural Education Programs* of the American Association for Agricultural Education's National Research Agenda as our study was to evaluate the effectiveness of the Texas 4-H Foods and Nutrition program on youth participants (Roberts et al., 2016).

The research objectives and hypotheses that guided our study include:

- 1) Examine the relationships among four program components, program duration and leadership development.
H₀₁: Duration of involvement in the 4-H Foods and Nutrition program is positively associated with engagement in the core program components.
H₀₂: Duration of involvement in the 4-H Foods and Nutrition program is positively associated with leadership skills.
- 2) Determine if the four program components predict leadership development after controlling for duration of program involvement.
H₀₃: The four core program components positively predicts leadership, after controlling for duration of program involvement.

Methods

Population Sample and Procedures

As a part of a larger study evaluating the effects of the Texas 4-H Foods and Nutrition program on youth participants, a database was used to generate 18,466 participants between the grades of 6 to 12 from the 2019-2020 Texas 4-H enrollment year. Then, using Constant Contact, an invitation email was sent to each parent email to provide an introduction of the study and the parental consent form. Of the 18,269 emails successfully delivered, 5,441 were opened. Parental consent and child assent forms were obtained for 514 youth and 424 youth provided valid responses to the survey during a two-week data collection from February 9- 23, 2021. The email included a link to the questionnaire in Qualtrics and was considered active during this time to accept participant responses. The first 150 respondents received a \$15 Amazon gift card and all respondents were entered into a drawing for a set of Apple AirPods valued at \$200.

The participants included in the study were 290 4-H members who have experienced at least one year in the Foods and Nutrition program from the sample of 424. All participants were between the ages of 11 and 19 and had 1 to 10 years of experience in the 4-H organization. Of these youth, 86.55% identified as white and 66.2% as female. The youth had 1 to 10 years of experience in the Foods and Nutrition program.

Instrument and research variables

The questionnaire items in the study were specifically designed for youth as young as eleven years old to capture their engagement in representative activities of the Texas 4-H Foods and Nutrition program, as well as their leadership. Items that are specifically relevant to the four core program components highlighted by the conceptual model of youth leadership development (Redmond & Dolan, 2016) were transformed and aggregated to represent youth engagement in each program component. The independent variables were the four core program components including authentic opportunities, mentor access, motivation, and mastery. We also included duration in the Texas 4-H Foods and Nutrition program as a control variable. The dependent variable was leadership development.

Authentic Opportunities

The opportunities for authentic experiences scale was designed to identify the instances when members were immersed in a real-world activity to apply learned knowledge and skills. This scale comprised three items to indicate whether the 4-H member had participated in them—food demonstrations, food show and food challenge practices, and coordinating food and nutrition-related community service activities. The first two items, food demonstrations and competition practices, consist of experiences where youth used real food, real tools, and real techniques, to demonstrate abilities. These first-hand experiences are genuine opportunities for participants to exhibit their authentic skills. Last, when coordinating community service activities within the project, the 4-H member is using this real experience to exemplify leadership. Youth will deepen their leadership skills while actively participating in planning a community event for others. For these three items, participants indicated which project or leadership activity they participated in

during their food and nutrition project by stating “yes” or “no.” The score for this measure ranged from 0-3 as the sum from each answer.

Mentor Access

The mentor access scale consisted of items that focus on the interaction between the participant and an adult. Mentor access was assessed by two binary items to indicate whether the 4-H member had participated in career shadowing or interviewing a professional. Career shadowing and interviewing a professional are common activities that participants in the food and nutrition program could participate in during their project. These items allow for youth to have a one-to-one experience with an adult. This develops a relationship between the participant and the adult mentor that creates access to support for leadership development for youth. For the items, participants were able to select which project activity they participated in during the food and nutrition project by answering “yes” or “no.” All answers were coded as a 0 for answering “no” and a 1 for “yes.” The score for this measure will be the sum of the two answers, thus ranging from 0-2.

Motivation

The motivation scale measured the participant’s motivation to continue developing skills and demonstrating role model behaviors to peers. The motivation subscale used four items asking whether the 4-H member had participated in educational presentations, presenting to stakeholders, project committee, or mentoring other 4-H members in the project. The first two items of educational and stakeholder presentations demonstrate the motivation of the participant in wanting to be a leader in the organization. By taking the initiative to spread information about a specific topic, prime leadership skills are being exhibited. Furthermore, the third item of serving on a project committee showcases the individual’s leadership through the core purpose of planning and motivating others to take action. Lastly, as a mentor to other 4-H members, these participants are showing a solid base of motivation to be a role model to others around them. The commitment to wanting to lead others in the community and spread knowledge about a topic shows leadership within the individual. For these items, participants were able to select “yes” or “no” to each activity they participated in during the food and nutrition project. The score for this measure is the sum of the four answers and ranges between 0 and 4.

Mastery

The mastery scale consisted of items that dissect the participant’s skill-based competition in the foods and nutrition project. Participants were asked to report the number of years they participated in Food Show, Food Challenge, FCH/Food and Nutrition Quiz Bowl, Educational Presentation, and Record Book at the county, district, and state levels. As the county-, district-, and state-level competitions were increasingly selective and challenging, each level was coded and weighted differently. The county level was coded as a 1 as long as the participant competed at least one year in that competition. The district level was coded as a 2 and the state level was coded as a 3. The 4-H member received the highest number as their score for each competition. In other words, participants’ higher levels of competition participation received higher scores to

show mastery within that contest. The mean of scores across all four activities was used to indicate participants' level of mastery, ranging from 0-3.

Duration in the Texas 4-H Foods and Nutrition Program

Duration is the amount of time (measured in years) each participating youth spent in the program area of food and nutrition as a 4-H member. Respondents used a 10-point sliding scale from 1 to 10 to report the number of years of their program participation.

Leadership

The leadership scale measured youth's thoughts and reflections about how 4-H impacted their personal development. For this scale, six items used were from the 4-H organization to determine if participants were gaining leadership skills. The items required that the 4-H members responded with their level of agreement with statements such as "*I am more comfortable speaking with others and working in a team since joining the organization*". Also, these items asked if the members became more confident in their leadership skills and "more active in the community. This measurement consists of a 7-point sliding scale with 1 being strongly disagree and 7 being strongly agree that the participants used to respond to the statement. These leadership scores will be the mean of the answers to the items of the scale.

Data Analysis

SPSS was used to analyze the data. For the first research objective concerning the relation among the four program components, program duration and youth leadership, a correlational analysis was conducted among these variables. For the second research objective, a hierarchical multiple regression analysis was conducted, with the four program components as the independent variables, youth leadership as the dependent variable, and duration in the Texas 4-H Foods and Nutrition Program as a control variable.

Results

The descriptive information from the study is shown in Table 1. The average age of the sample is 14 years old ($M = 14.04$, $SD = 2.02$). The sample consisted of 67% female ($M = 1.67$, $SD = 0.47$). The average years of participation in Texas 4-H was 5 years ($M = 5.28$, $SD = 2.43$) and in the food and nutrition program was almost 4 years ($M = 3.9$, $SD = 2.47$).

Table 1
Descriptive Statistics and Intercorrelations of Variables

	1	2	3	4	5	6	7	8	9
1. Age	1	-	-	-	-	-	-	-	-
2. Gender	-.04	1	-	-	-	-	-	-	-
3. Years in 4-H	.50**	-.08	1	-	-	-	-	-	-
4. Duration in F&N	.45**	-.03	.68**	1	-	-	-	-	-
5. Mentor Access	.17**	.01	.30**	.31**	1	-	-	-	-

6. Authentic Opportunities	.20**	.01	.30**	.40**	.53**	1	-	-	-
7. Motivation	.32**	-.11*	.44**	.51**	.53**	.55**	1	-	-
8. Mastery	.31**	-.07	.44**	.59**	.37**	.56**	.61**	1	-
9. Leadership	.09	-.01	.25**	.27**	.25**	.31**	.27**	.32**	1
<i>N</i>	290	288	290	290	288	288	288	288	288
<i>Mean</i>	14.04	1.67	5.28	3.90	.46	1.77	1.19	.77	6.13
<i>SD</i>	2.02	0.47	2.43	2.47	.71	.95	1.19	.56	.95

Note: Gender code: Male = 1, Female = 2. **Significant at the 0.01 level. *Significant at the 0.05 level.

Hypothesis 1: Duration of involvement in the 4-H Foods and Nutrition program is positively associated with engagement in the core program components.

The duration of participants' involvement in the 4-H Foods and Nutrition program was positively associated with the participants' levels of mentor access, engagement with authentic opportunities, motivation, and mastery ($r = .31, .40, .51, .59$, respectively, $p < 0.01$) (Table 1). Therefore, the first hypothesis was supported. Additionally, the four program components of authentic opportunities, mentor access, mastery, and motivation have significant correlations with each other.

Hypothesis 2: Duration of involvement in the 4-H Foods and Nutrition program is positively associated with leadership skills.

There was a statistically significant positive correlation between 4-H members' duration in the program and their leadership score ($r = .27$). Thus, the second hypothesis was supported that the longer the participants participated in the 4-H Foods and Nutrition program, the greater leadership they reported possessing (Table 1).

Hypothesis 3: The four core program components positively predict leadership, after controlling for duration of program involvement.

A hierarchical multiple regression was conducted to examine whether the program components predicted participants' leadership skills. The first regression model had leadership as the dependent variable and the predicting variables were the program components of mentor access, authentic opportunities, motivation, and mastery. The model was significant indicating the program components together predicted leadership ($R = .37$, $Adj. R^2 = .12$, $F = 11.23$, $p < .001$), explaining 12.3% of the variances in leadership with a medium effect size. However, only authentic opportunities ($\beta = .15$, $p < .05$) and mastery ($\beta = .17$, $p < .05$) were significant predictors (Table 2).

Table 2

Regression Analysis Predicting Leadership with Program Components (N = 288)

	<i>b</i>	<i>SE</i>	<i>Standardized B</i>	<i>p</i>
Mentor Access	.12	.09	.09	.20
Authentic Opportunities	.14	.07	.15	.04*
Motivation	.03	.06	.03	.66
Mastery	.32	.12	.19	.01*

Note: Dependent Variable: Leadership; **Significant at the 0.01 level; *Significant at the 0.05 level.

In the second regression model, duration in the Texas 4-H Foods and Nutrition program was included as a control variable because one could enroll in the program without really being involved. When predicting leadership, the model was significant at Step 1 with duration entered ($R = .27$, $Adj. R^2 = .07$, $F = 22.91$, $p < .001$). Further, the model retained significance at Step 2 when the program components of mentor access, authentic opportunities, motivation, and mastery were entered ($R = .37$, $Adj. R^2 = .12$, R^2 Change = .07, $F = 5.54$, $p < .001$). However, none of the variables were significant in predicting leadership (Table 3). Thus, the third hypothesis was partially supported that although the four core program components significantly predicted leadership collectively, none of the core program components were significant predictors by itself when program duration was included as a control variable. Only authentic opportunities and mastery were significant predictors when program duration was not included in the model.

Table 3

Regression Analysis Predicting Leadership with Duration and Program Components (N = 288)

Model		<i>b</i>	<i>SE</i>	<i>Standardized B</i>	<i>p</i>
1	Duration	.11	.02	.27	<.001***
2	Duration	.03	.09	.09	.22
	Mentor Access	.11	.09	.09	.21
	Authentic Opportunities	.14	.07	.14	.05
	Motivation	.01	.06	.01	.86
	Mastery	.25	.13	.15	.06

Note: Dependent Variable: Leadership; **Significant at the 0.01 level; *Significant at the 0.05 level.

Conclusions/Recommendations/Implications

Youth leadership develops over time within a program but how this process happens is still understudied. While 4-H program is an important context for practitioners to promote youth leadership, specific parts of the program that foster leadership needs to be identified. Our study investigated 4-H Foods and Nutrition Program components to identify how leadership was fostered, considering the prestige in the organization's credibility in developing young leaders (Boyd et al., 1992; Seevers & Dormody, 1994). Four core program components of mentor

access, authentic opportunities, motivation, and mastery were investigated for their association with leadership based on Redmond and Dolan's (2016) youth leadership development conceptual model.

The first hypothesis was supported by the positive correlations between the program components and program duration. Thus, a participant's duration in the program is associated with the core components relevant to leadership development. This finding parallels with previous research as the program components need time to foster the development of skills in youth. Programs that allow participants to bond with a mentor provide a positive influence and support to the individual in developing skills (Rhodes & DuBois, 2008). A high-quality relationship between the mentor and participant takes time to strengthen and truly be effective (Bearman et al., 2007). This supportive adult helps create authentic experiences for youth to comfortably practice their skills with guidance. Galdwell (2008) highlights that to successfully develop useful skills, youth need access to genuine opportunities. Over time, these skills will become developed as participants engage in more authentic experiences. Program duration mixed with real opportunities and adult guidance gives youth a chance to exhibit motivation and mastery. Participants demonstrate motivation over time by continuing to practice learned skills (Kouzes & Posner, 1995). The longer youth are engaged in a program, the more chances they will have to inspire others with their acquired skills. Program duration also plays a role in mastering a skill set as determination is needed for development (Roberts, 2009). Engaging in mastery is a process that requires reflection of previous experiences and overcoming obstacles to individually grow (Kouzes & Posner, 1995). As supported in this study, these solid program components and the appropriate program duration provide youth the opportunity to develop skills and abilities (Edelman et al., 2004).

Second, we identified the positive relation between how long a 4-H member participated in the food and nutrition program and their leadership skills score. The second hypothesis was supported by showing a positive association between duration and leadership of participants. Therefore, the longer a participant participated in the 4-H foods and nutrition program, the more leadership abilities the member exhibited. This hypothesis is supported by previous research. Lynch et al. (2016) highlighted the positive correlation between an adolescent's active involvement in a program and the program's positive outcomes. This relates to the research about longer duration leading to more exposure of program materials to the participant (Eccles & Roeser, 2011). By being engaged in a program over time, youth will be introduced to more information than a participant who was involved for a shorter time period. Additionally, different types of programs have different foci and were shown by Hansen, et al., (2003) to have different positive outcomes in youth. This explains how an impactful program curriculum can affect youth who are actively participating. Also, Larson et al. (2006) reported how positive developmental experiences in a program are associated with program duration. Youth with positive experiences were engaged in a program longer than a participant who had negative experiences. A combination of duration, educational curriculum, strong program focus, and positive experiences can help youth gain valuable skills to be successful. Thus, youth actively involved in positive, curriculum-based programs over time can develop solid leadership skills and abilities to use in life. This previous literature supporting the relation between duration and leadership development also supports the study's finding of duration as a predictor of leadership.

Additionally, there were significant associations among the program components of mentor access, authentic opportunities, motivation, and mastery. This supports the youth leadership development conceptual model (Redmond & Dolan, 2016) which theorizes that these components “go together” possibly due to the strong interrelationships. The bond between the program components highlights that the presence of each could be beneficial to the participant. The core program components are interlinked to give youth chances to demonstrate learned skills (Redmond & Dolan, 2016). Mentor access and authentic opportunities create safe environments that allow youth to continue to exhibit motivation and mastery of desired passions. The study emphasized the significant correlation of these four components with each other. Therefore, youth programs that focus on one of these program areas could have success with combining the components and creating a complete program for youth (Witt & Caldwell, 2018).

Our study found that the program components of mentor access, authentic opportunities, motivation, and mastery were not all significant predictors of leadership in youth. However, authentic opportunities and mastery were significant in leadership development, when program duration was not included in the model. This could tie back to previous literature on creating genuine experiences and mastering a skill set during leadership development. Galdwell (2008) emphasizes how youth need access to authentic opportunities to develop leadership skills and abilities. Participants who experience real chances to actively use their knowledge and skills will be able to strengthen their leadership abilities within a program (Kahn et al., 2009). Mastery includes participants to learn from previous experiences of practicing through reflection and persistence (Coyle, 2009). Roberts (2009) identifies individual determination as a key aspect in leadership. Authentic opportunities and mastery program components could be higher predictors of leadership than mentor access or motivation due to the association of hands-on practice. This idea is supported by Kolb’s (1984) experiential learning model where knowledge is developed through learning experiences. 4-H programs are designed based on Kolb’s model; therefore, practitioners should emphasize these components in youth programs to maximize developing leadership skills. Creating time for youth to be immersed in a genuine experience by practicing their skill set can allow mastery of those abilities as well. More authentic opportunities an individual has to strengthen their skills, the deeper level of mastery in leadership that person could potentially reach (Kahn et al., 2009). Hence, these two program components are supported in the prediction of leadership in food and nutrition program participants.

However, mentor access and motivation were not suggested to predict leadership development. This could be due to the involvement of others in these program components. Previous literature supports the presence of mentors and individual motivation during leadership development. Sosik and Godshalk (2000) highlight how having open access to a mentor is a crucial component for leadership development in youth. As for the motivation component, youth will also inspire others through a shared vision to succeed (Kouzes & Posner, 1995). Adult mentors and the motivation of peers both include the presence of another human. These components rely on others to support them and to inspire individuals around them to deepen their own leadership skills. One reason these components do not predict leadership could be due to a lack of a present dyadic relationship with another person. Youth are able to engage in authentic opportunities and mastery individually so these components may be more accessible than mentor access and mastery.

The hierarchical multiple regression revealed that the models were statistically significant. The first model found only duration as an independent predictor of leadership. The next model controlled for duration and found that the program components and duration were not individual predictors of leadership. However, due to the model's significance, duration plus the program components predicted leadership when the variables were together. This explains the youth leadership development conceptual model's idea of needing all components to successfully develop leadership skills. The study's findings provided support to Redmond and Dolan's theory in developing leadership within youth with the interrelationships of the program components.

One limitation of this study was the response rate due to self-selection within Texas 4-H members to submit the questionnaire. The number of youth enrolled in Texas 4-H for the 2019-2020 school year was not representative of the sample size. 18,269 emails were successfully delivered to parents of the participants and only 29.2% of the emails were opened. However, after data cleaning, $n = 424$ for the total number of respondents which is 2.3% of the population. After filtering out the 4-H members who were not in the food and nutrition program, $n = 290$ (68.4% of the sample). 4-H members who successfully answered all the questions showed motivation to participate. This showed a possibility of having stronger leadership skills than the general 4-H population. Thus, an assumption of higher leadership scores influenced by program duration was not supported.

Another limitation was the newly designed constructs for this study to evaluate leadership skills in youth. These scales were uniquely fabricated using the theoretical model and the common activities completed by participants during the program and this study failed to fully support this model through the 4-H Foods and Nutrition program. These scales were based on the 4-H Foods and Nutrition program which did not specifically state leadership as a designated project outcome. The food and nutrition program strives for the development of food and kitchen safety, nutrition knowledge, food purchasing, and related careers (Texas 4-H, 2021). Therefore, the program design is around food-related skills and abilities. While leadership skills are not one of the main focuses of this program, the 4-H organization values leadership as an overall outcome. Further development of these innovative constructs is encouraged to identify leadership skills being developed in the food and nutrition knowledge-focused program.

In addition, all data were obtained from youth self-report. Potential shared method effect or bias in self-perceptions could not be eliminated. Future research should consider multi-instruments from multiple respondents to enhance the accuracy and robustness of the data and results. The study used only cross-sectional data to test the conceptual model. Despite the theoretical framework about the program process for leadership development, causal relationship could not be drawn from cross-sectional data. It is equally possible for youth with greater leadership to benefit more from the program processes and to stay longer in the program. As age and gender were not significantly associated with youth leadership, these two demographic variables were not controlled for further regression or path analyses. Participants' involvement in other 4-H projects is a potential confounding variable. Future research could examine whether this variable needs to be controlled for.

We also recommend that future research should also discuss conducting a longitudinal study over multiple years to follow leadership development within youth. This could be done by

starting with younger 4-H members and collecting data on their leadership skills through high school or after. The most important points in fostering leadership development within youth could be identified from analyzing multiple years. Finding the key activities or times when youth are most susceptible to practicing leadership skills within these four program components could be extremely helpful to practitioners. Since duration was an important factor in leadership development, a longitudinal study may be beneficial for researchers.

Lastly, our study offered important implications for 4-H practitioners. 4-H practitioners should focus on program design to unlock potential leadership skills. The longer duration the participant is engaged, the stronger development of skills the youth will demonstrate. To develop leadership, a curriculum focused on growing specific leadership skills over the course of a longer duration would be beneficial for youth. 4-H practitioners should also design programs using all four program components with a solid curriculum and participant duration for a complete program. However, emphasizing authentic opportunities and mastery in youth programs should take priority as the predictors of leadership skills. With a foundation of skills, providing chances to use these skills through authentic opportunities with mentors' present can lead to youth actively demonstrating motivation and mastery. This will maximize the skill development within youth when all components are combined.

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Empowering Hidden Voices: A Photo Narration of Community Food Needs By Two Cross-Town Middle Schools in Kentucky

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Abstract

Children are among those most directly affected by food insecurity, a condition in which households lack access to adequate food because of money or other resources (Gundersen & Ziliak, 2015). According to the latest United States Department of Agriculture (2016) reporting, 1 in 5 children experiences hunger on a daily basis. That ratio increases for African American and Latino children whom experience 1 in 3 ratios. While many programs exist to address this growing problem among youth and impoverished families, the efficacy of those programs is yet to be determined and the problem of hunger in America persist. This qualitative research study utilized an innovative methodological approach to explore youth food justice narratives from two cross-town middle schools in Kentucky. Through the use of photos, students identified several factors that influence their ability to meet their food needs and areas of inequity within their community. Strategies were provided for policymakers and educators to address these issues.

Introduction

Food insecurity is a growing problem as one in six Americans, and even more families with children: 20.6% vs. 12.2%, face hunger (Rabbitt & Smith, 2021). Food insecurity can be defined as a condition in which households lack access to adequate food because of limited money or other resources (Gundersen & Ziliak, 2015). Children are among those most directly affected by food insecurity. According to the latest United States Department of Agriculture (2021) reporting, 1 in 5 children experiences hunger on a daily basis. That ratio increases for African American and Latino children whom experience 1:3 ratios.

A plethora of initiatives exist today in hopes to resolve these expanding problems, many of which target youth. According to the USDA, over 20 million children qualify for free and/or reduced-price meals each day at school (2016). Unfortunately, less than half of them get breakfast and only 10% have access to summer meal sites. In the U.S., 1 in 7 individuals are enrolled in Supplemental Nutrition Assistance Programs (SNAP) and nearly half are children. With no long-term solution in sight, improvement within the current system and relief efforts are needed. Namely, the inclusion of those voices and perspectives most directly affected.

Food is a fundamental need for all human development. While many programs exist to address the growing problem of food insufficiency within youth and impoverished families, the efficacy of those programs is yet to be determined and the problem of hunger in America persist. Furthermore, many of the reviewed research on federal food assistance programs identifies deficiencies in the programs currently in place within schools and communities to address the problem of food insufficiency (Duffy & Zizza, 2016; Huang & Barnidge, 2016; Lewis et al., 2011; Martin et al., 2013; Nicholls et al., 2011). Research gathered in this area will not only benefit those directly impacted by government funded programs and initiatives aimed to end food insufficiency, but also any researchers and community organizers who seek to understand

more deeply the food environments of youth and the connections of those environments to the growing problem of food insecurity among them.

Kentucky is particularly at-risk for food insufficiency and hunger. The Association of Food Banks revealed that 743,310 individuals, including 222,380 children, are food insecure (2016). Fayette county is just one of the many areas of concern, and contains the second largest city within the STATE. According to Feeding America's Map the Meal Gap, the food insecurity rate in Fayette county is 16.6% overall, and 17.5% among children (2017). The American Health Foundation further reveals the food insecurity rate in Kentucky is nearly 4% higher than the national rate and has slowly increased from 2015 (16.4%) to 2017 (17.6%); therefore, while food initiatives continue to exist, hunger has yet to be diminished.

Theoretical Framework

The foundations of this study is guided by John Rawl's theory of Social Justice (1971). Rawl established the theory of Social Justice with the concept that freedom and equality are not mutually exclusive. His assessment of the justice system led him to conclude that for justice to be truly just, everyone must be afforded the same rights under the law. According to the concept of food sovereignty, every human being is born with an innate right to food and sustenance (Carney, 2012). However, this right is not always met. While many factors can be attributed as having caused food disparity among the U.S. population, it seems there is a systematic divide within the social class that influences various contributors to the lack of food sovereignty. Perhaps the most significant characteristic of this social divide is poverty and socioeconomic status (SEC). Poverty can then be connected to a variety of issues and health concerns that further perpetuate the problem. USDA GPRFA Food security Indicator determined that food security depends on a variety of demographic, economic, geographic, and household structure factors (Nord, 2007). Other demographics and identifiers such as gender, marital status, stressors and food stamp participants are also associated to food insecurity, and obesity- especially among women (Franklin, et al, 2011). If we are to change the outlook of food sovereignty for all, we must begin to change the language and social dysfunction surrounding hunger (Carney, 2012).

The inequity that results from a systematic division of social classes and demographics feeds into the issue of access among the poor. A persons' race/ethnicity and poverty index ration (PIR) are shown to have a significant influence on their availability to food, meal patterns, and food expenditures in youth homes (Masters et al., 2014). The racial "symbolic boundaries" and socioeconomic barriers that emerge as a result of food mirages severely limit food access to poor and minority communities (Sullivan, 2014).

It should come as no surprise that within food deserts, and naturally within low-income households, there is a nutrition related health concern. Diabetes and Heart Disease are among the major concerns for those citizens not provided with adequate food and nutrition in the U.S. (Budzyzka et al., 2013; Lang & Heasman, 2016; Lee et al., 2015).

Purpose/Research Questions

The purpose of this study is to identify local food environments and approaches to acquire food needs as depicted by food insecure youth. Many food insecure youth face day-to-day realities of

hunger, and the effects of a long history of systematic oppression that has left their voices stifled (Alkon & Agyeman, 2011; Mayer, 2015).

The research questions for this qualitative, focus group study are the following:

RQ1: What do selected youth identify as approaches to assisting their food needs?

RQ2: Do youth identify areas where food injustice exists?

Methodology

This study was qualitative in design and utilized an innovative methodological approach with youth in two cross-town middle schools. The researchers obtained approval from the Office of Research Integrity at the University of Kentucky with the approval number 17-0576-P4S. Student participation was voluntary, and no reward was given to those involved. An integrative epistemological foundation was set through the researchers' worldviews.

The participants ($n = 74$) from this study were students enrolled in agricultural science courses at two middle schools within the same school district in Kentucky. Ages of participants ranged from 11 to 14 years of age. Consent was obtained from both school, guardian, and student.

The participating schools were identified as *School 1* and *School 2*. School 1 had 19 student participants and reported a student enrollment of 100% free and/or reduced lunch rate, indicating a school community with low socioeconomic status (SES). Of the 19 student participants in School 1, 14 were male and five were female. The majority of the students' racial background at School 1 was Hispanic/Latino (41.7%), followed by Black (29%) and White (29%). Nearly 17% of the students spoke English as a second language, which is identified as "large" within the school district.

School 2 had 55 students consent to participate in the study. Of the 55, 36 were male and 21 were female. The predominant race among the students at School 2 was White (62.2%), followed by Black (21.2%), Hispanic/Latino (5.9), and Asian (4.7%). As opposed to School 1, School 2 reported a 33% free/reduced lunch rate, which is lower than the district's 56% reported rate.

The study was guided by the Community Based Participatory Research (CBPR) approach (Israel et al., 2012; Israel et al., 1998). The methodology of Photovoice (Wang & Burris, 1997) was utilized to allow students the opportunity to explore and share their own food narratives while identifying, representing, and enhancing their community through a specific photographic technique. As a practice based in the production of knowledge, Photovoice has three main goals: (1) to enable people to record and reflect their community's strengths and concerns, (2) to promote critical dialogue and knowledge about important issues through large and small group discussion of photographs, and (3) to reach policymakers ().

For the context of this study, a constructivist approach to Photovoice was utilized to present issues within the food environment, such as the earlier mentioned themes of inequity, access, nutrition, and behaviors, working in collaboration with youth participants to co-create an understanding of the problems posed by the research questions (Sahay, Thatcher, Nunez, & Lightfoot, 2016; Lincoln, Lynham, & Guba, 2011). In this approach, research questions are not predetermined, but rather culminated from group discussions and group consensus. In this way, Photovoice is an empowering methodology (Wallerstein & Bernstein, 1994) strongly informed by Paulo Friere's concepts of problem-posing and co-learning (Freire, 2020). By approaching matters in this way, the researcher sought to elicit the knowledge and expertise of individuals in

an effort to transform historical and social realities.

Following the Photovoice methodology, students were presented with a means to take photos: using personal smart phones or chrome books, or 6 disposable cameras, and a digital camera provided by the researcher. Students were tasked with capturing and/or downloading images that represented their food environment and factors influencing their food decisions. Students were instructed to pay close attention to the role of food, possible barriers toward receiving it, and their own perceptions of health. Students had one week to take or download photos and create corresponding captions. At that point, photos were sent to email accounts specific to the Photovoice project at each school. The researcher printed all photos submitted to the email address for each school. The group reconvened a week following photo and caption collection. At this meeting, the researcher provided each student with his or her printed photos. Students were then instructed to create collages that represented their food stories and the food needs they wanted to convey. The following day, students had the opportunity to share their collages with the class and participate in one-on-one interviews with the researcher. Due to time limitations, the researcher came back for an additional visit to interview more participants. During this visit, students were able to volunteer to have their collages displayed around the school to communicate their personal and community needs. Throughout the entire study, the research collected participatory observation notes focusing on recurring themes and ideas presented by students, as well as retained key concepts.

Photo Procurement

Students were allowed to draw images, provide personal images, take photos, and find photos online. Once students compiled their collages, they then had an opportunity for communal viewing where they were able to view their peers' perspective of their own personal food environment, needs, choices and influences. They were encouraged to question each other and engage in discussion to attain a deeper understanding of their classmates and avoid personal assumptions. The photovoice collages were then analyzed for themes, reoccurrences, trends, and patterns by the participants. Each individual image was taken in consideration, along with the overall collage, when determining these factors. The photovoice collages were then analyzed, by the researcher, a second time for themes, reoccurrences, trends, and patterns, and were then compared between schools to find correlations and variables for explanation.

Individual Interviews

At random, students involved in the project from each school were asked to participate in semi-structured interviews where the questions were tailored to the principles of Social Justice theory, specifically addressing aspects of student perspectives and inequalities revealed through the Photovoice activity. Each one-on-one interview lasted between 10-15 minutes and took place in the hallway outside of each student's classroom. Each interview was recorded and transcribed. The researchers conducted content verifications through post interviews, when necessary, which assisted in establishing data confirmability (Denzin & Lincoln, 2005). A colleague, not associated with this study and with research experience in Social Justice theory, was recruited for cross-checking the coding determined by the researchers. Peer debriefing occurred throughout data collection by an outside source. The interviews, transcriptions, coding, and the researchers' reflections were maintained for the credibility, transferability, confirmability and dependability of the results and the feasibility to guide future studies.

The reality of hunger and the phenomenon of food insecurity within the U.S. is a complex issue that is difficult to address. This issue can be even more difficult for youth to tackle, as their ability to get food often hinges on factors outside of their control. Within the study population, it became evident that many individuals being interviewed had never considered their means of obtaining food, had never thought to identify their food environment, nor had they a full context of understanding of the hunger that exists in their community. While some food choices in regards to taste preferences or sports involvements was shared, very few students expressed power in the decision making process at all when it came to the food they consumed. School 1 appeared to be particularly unaware of this issue and even went so far as to say they had no influence in picking the food they consumed.

Findings

The findings from this study were numerous and encompassed several recurring themes in accordance with the proposed research questions. Within research question one, four themes were identified in addressing student food needs: (1) Health/Nutrition; (2) Power/Voice; (3) Barriers; (4) Choice. Through the consideration of research question two, students were able to identify areas where food injustice exists. Three subsequent themes emerged through student responses: (1) Hidden hunger and (2) Awareness.

Health and/or nutrition can be identified as students' perceptions of a need in meeting their daily food needs. Power and Voice are defined through this study as the perceived decision-making power youth have over the food they consume. Barriers were identified by students to mean those physical and social obstacles necessary for someone to access the food they need. Finally, Choice was expressed as those deciding factors that lead to a person choosing one food item over another and the need for preference in meeting someone's food needs.

Health and Nutrition.

Students shared mixed opinions on the role of nutrition and health to satisfy a person's food needs. On a personal level, many students revealed this to be a lesser factor in influencing the food that they ate than taste, preference, or convenience. In fact, when asked what was necessary to meeting their food needs, many students omitted health and nutrition all together. However, this was contrary to the beliefs students held about meeting the food needs of others in their community. Nearly all of the student participants agreed that health and nutrition were important parts of meeting the food needs of others. Students from School 2 appeared to be more health conscious than students from School 1.

Figure 1.

Student from School 2 sharing a photo representing their school lunch and stated, "School lunch is disliked by many because it is unhealthy, it tastes bad, and it smells like tear gas." The same student also explained in his presentation to the class that his family, along with a lot of his peers, drink coke and that it is not good for your health. He though school lunches should be healthier and tastier.



Power and Voice.

Perhaps the most evident factor differing results from School 1 and School 2 was the difference in students' perceived power and voice in selecting their food needs. The students from School 1 reported less involvement in their eating decisions, with many of them being fully reliant upon their families to make their food decisions for them. In *Figure 2*, a student from School 1 shares a photo of what they eat when there is no food left in the house, because they have little control over what is available to them. For those from School 2 who did feel as though they had more of

a say in the food they consumed, it was clear that family dynamics still played a factor. One student utilized her photo collage in *Figure 3* to express the many ways in which her family, and the memories they share together, shape her food experiences and choices. While her decisions are heavily influenced by family, she exhibits a strong voice of her own. She shares memories of going to the Melting Pot in Louisville, and having food with her family. In one caption she states, "My stepmom makes the best spaghetti. It is my brother's favorite food, and we are always excited when she makes it."

Figure 2
Student from school 1 regarding lack of power and voice in food selection.

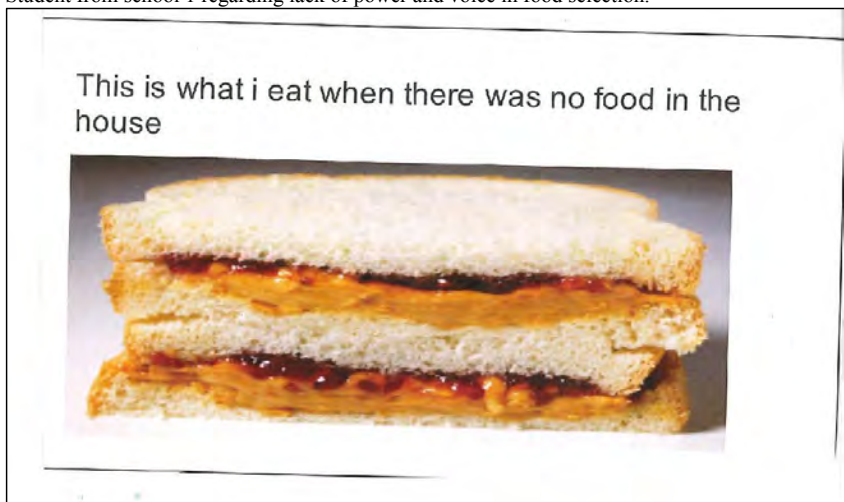


Figure 3
A student from School 2 wanted to share how her family influences her food choices and what has become her favorite foods.



However, students from both schools appeared to be heavily influenced by their social and peer groups. Regardless of the context, students revealed that their family and social environments play a major factor in the food they eat and their perceptions of personal food needs. One student in particular shared a rich story of when her mother was attending college and she received all of her food from her grandmother. She also explains how the stigma of her friends shaming her into eating less played a role in her eating habits. This visual can be viewed in *Figure 4*.

Figure 4
Student from School 1 sharing how family impacted her ability to obtain food.



Perceived Barriers.

While many barriers influence the prominence of food security in the studied areas, most students identified finances to be the most influential boundary to meeting their community’s food needs. In Figure 1 a student from School 1 shared the barriers that influence her ability to obtain food. She mentioned transportation, money, her school and family environment, and her access to a local grocery store. One student from School 2 chose to draw their photo collage but answered the barriers as it related to their community. In their picture, they shared the foods they typically enjoyed with the prices listed on them. As one can see in Figure 6, the student’s selected places to eat reflect a selection that is associated with more prosperous family earned income (e.g. Panera, Chipotle, Old Chicago).

Figure 5
Perceived Barriers as Depicted From a Student at School 1



Figure 6.
Student From School 2 Depicting Financial Reasons to Obtain Food in Their Community



Although differences of opinion occurred throughout each school regarding this question, prominent differences were also witnessed between School 1 and School 2. School 1 more consistently shared the perspective that meeting food needs was something that each person had control over. Whereas the majority of individuals at School 2 saw this as being connected to having a job and recognized that there are outside circumstances that could influence food security.

Food Choice

Perhaps the most repeated factor students categorized as necessary to meeting their food needs was food choice and preference. When talking about the food students consumed or would need

on a daily basis, they consistently stated a need for food that they enjoyed eating. For these students, having food that they enjoyed eating was more important than meeting their daily nutrition and health needs. The classification of “healthy foods” also differed from student to student. Some of the students at School 2 identified food such as potato chips and butter as being healthy and part of their food needs, among other things. It is evident there may be some confusion among the interviewed youth as to what healthy means and what is necessary to meeting their nutritional needs. John, a student a School 2, discussed how advertisements make a lot of decisions on what he and his family choose for their meals and depicted it in Figure 7.

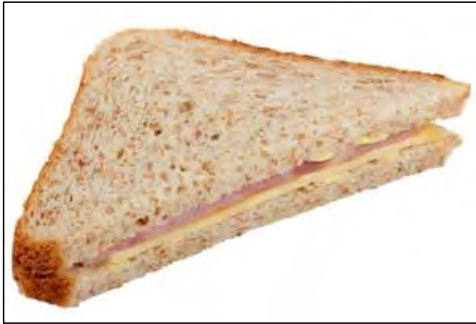
Commented [CKA1]: Influence decisions

Figure 7
A student from School 2 shared the factors that influence their food choice.



A prominent factor that was discussed by students from both schools was the topic of school lunches and the insufficiency of these lunches to meet their food needs. Many students at School 1 felt again as though they had no allowance to be able to make food choices related to their lunches at school. One student resorts to eating chips at home to fill their belly since they were still hungry leaving school. Almost universally, students who talked about school lunches referred to them in a negative way or offered suggestions for ways to improve them. At School 1, one student provided a picture of sandwich (Figure 8) and stated, “At school I pack a ham and cheese sandwich for lunch. I pack this sandwich because it is very easy to make, and I don’t want to eat the school lunches.”

Figure 8
Sarah, a student from School 1 spoke about her food choice over school lunch.



Students depict a need to improve lunches provided by their schools and the choices they've made as a result. One of the students from School 2 wanted to share their food environment by showing some of the places they eat food. This student pointed out a significant meal, the lunch they have at school, which entailed two sandwiches, two fruits, a brownie, and vegetables. He stated in his caption: "This is what I eat at school for lunch because I don't like school lunch." The student later reiterated in an interview how the school lunches don't satisfy him and so he settles for Starbucks in the morning and Raising Cane's® Chicken Fingers after school.

Conclusions, Implications, & Recommendations

The students used photos and images to illuminate a diverse array of structural and social influences on meeting their food needs and creating areas of injustice within their communities. Through the process of sharing and discussing their photographs with one another and the researcher, they identified commonalities in the barriers and influences present in their communities. Although from the same town, it is clear that the students from the two different schools have different access to food and food needs.

The reality of hunger and the phenomenon of food insecurity within the U.S. is a complex issue that is difficult to address. This issue can be even more difficult for youth to tackle, as their ability to get food often hinges on factors outside of their control. Within the study population, it became evident that many individuals being interviewed had never considered their means of obtaining food, had never thought to identify their food environment, nor had they a full context of understanding of the hunger that exists in their community. While some food choices in regards to taste preferences or sports involvements was shared, very few students expressed power in the decision making process at all when it came to the food they consumed. School 1 appeared to be particularly unaware of this issue and even went so far as to say they had no influence in picking the food they consumed.

The findings of this study suggest that several areas contribute to meeting the perceived food needs of youth in the two cross-town schools involved in this study. First, it became apparent through repeated occurrences with students that meeting community food needs means re-evaluating school lunch programs. While student from School 1 and School 2 shared differing opinions on the importance of health and nutrition in meeting their food needs, it was universally agreed that school lunches did not fit the needs of students in the areas of health or taste preference. Some students provided additional information regarding the social environment

surrounding food and how those students needing food assistance are singled out and made to feel worse. In moving forward, it is recommended that educators, legislators, and school policy members keep in mind the intricacies of meeting youth food needs and approach students with dignity when providing much-needed assistance.

Despite the positive feedback from students and involved faculty, there remain three areas for growth in which the researcher can employ the findings of this study. These areas are: (1) Teachers and School Administration, (2) Community Leaders, and (3) Politicians. We urge future scholars to closely connect the relationship these three have on the sociological setting these young adults have and the food needs and food access that each have.

Discussion

Another interesting finding from this study was the emergence of student thought regarding taste and preference as more influential factors in meeting their food needs than that of health, which has previously been regarded as the main consideration in providing nutrition through food initiatives. Health is obviously an important factor, but future research and aid should also take into consideration the appropriateness of the food that is being presented to individuals, and especially youth, who are in need. Many students also brought up the notion of ethnic food when discussing the food they most enjoy (taste/preference). This criteria can be included as another consideration, deeming food as culturally appropriate to be and important part of meeting community food needs when forming food initiatives.

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Communication Channel Use: Assessing Media Richness as an Approach to Graduate Student Recruitment in a College of Agricultural and Environmental Science

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Demand exists for a workforce with graduate degrees in agricultural and environmental sciences. However, research on effective graduate student recruitment into colleges of agricultural and environmental sciences (CAES) is limited. Prospective graduate students consider distinctive factors when selecting an institution, necessitating further examination of their communication channel use. Media richness theory posits communication media are on a continuum of leanness to richness, and agricultural communicators can select the proper medium for an audience based on the message and its richness. The purpose of this study was to explore the effects of media richness during the recruitment of successful graduate students. Nineteen graduate students representing 10 departments within a CAES participated in semi-structured interviews. Qualitative inductive coding revealed three prominent communication channel themes: online, indirect, and direct. Findings indicated participants began their journey using indirect and online channels with less personalization and moved into richer media with the capacity for immediate feedback as their interest increased. Participants expressed disappointment at online channels with outdated information because they felt impersonal. Participants preferred phone or zoom calls as rich media to understand institutional culture, valuing personalization and immediate feedback from current students.

Introduction

The demand for college graduates with experience and expertise in agricultural and environmental sciences is expected to exceed the number of graduates in these areas from 2020-2025 (Fernandez et al., 2020). Recruitment of capable students into colleges of agriculture and environmental science (CAESs) is essential for industry advancement and has thus been researched from various angles (Baker et al., 2013; Beyl et al., 2016; Westbrook & Alston, 2007).

However, existing studies centered on attracting undergraduate rather than graduate students into CAESs. In 2013, major life science companies anticipated hiring more than 1,000 agricultural scientists in the U.S. between 2013 and 2015. Companies indicated 46% of these scientists would need to have doctorate degrees (Coalition for a Sustainable Agricultural Workforce, 2013). In a subsequent survey, 16% of agricultural employers agreed they preferred hiring M.S. or Ph.D. candidates over those with only bachelor's degrees, demonstrating the need and preference for well-trained graduate students with interdisciplinary industry experience (Chakraborty et al., 2017). In the 2020-2021 academic year, 11.2% of doctoral degrees (6,936) and 3.7% of master's degrees (15,700) awarded in the United States were in biological and agricultural sciences (Zhou, 2022).

The graduate degree experience is wholly different than the undergraduate experience. Graduate students consider distinctive factors in selecting an institution and degree program including the availability of funding or graduate assistantships, the opportunity to conduct research, the faculty member with whom they will work, or the availability and variety of courses (English & Umbach, 2016; Poock & Love, 2001; Shellhouse et al., 2020). Program choice is also influenced by degree level pursued. For example, Shellhouse et al. (2020) found doctoral students were more likely to consider research when entering a graduate program than master's students. The flexibility of offered coursework and applicability to current careers also played a role in graduate program choice for working professionals pursuing graduate education (Shellhouse et al., 2020). Additionally, prospective graduate students are motivated by professional goal achievement, advancement in their current field, or because a graduate degree is required for their desired career, among other reasons (Hardré & Hackett, 2015). The process of recruiting and admitting graduate students is also complex and often segmented across various offices and departments, governed by a complex set of policies at each university and low on the priority list of administration (Balayan et al., 2022). Previous studies have examined precise aspects of graduate student interests within specific CAES disciplines including animal science (Serão et al., 2021), horticulture (Arnold et al., 2014), agricultural social science (Shellhouse et al., 2020), and natural resources (Copenheaver, 2020). However, broad recruitment of graduate students into programs within CAES has not been thoroughly explored.

Theoretical Framework

The theoretical framework for this study was media richness. Media richness theory began as a method to examine inter-organizational communication media because human systems are far more complex than machine systems (Daft et al., 1987). Media richness posits that communication media are on a continuum of leanness to richness, and communicators can select the appropriate medium for audiences based upon the message and its richness (Ledford, 2012). Four factors determine the richness of a communication medium including “the medium's capacity for immediate feedback, the number of cues and channels utilized, personalization, and language variety” (Daft & Lengel, 1986, p. 560). Face-to-face communication, considered the richest communication medium, can provide immediate feedback, deliver cues through body language and tone of voice, has capacity for personalization to the audience, and can adjust language to be more natural (Daft & Lengel, 1986). Rich communication media can be used to convey information ambiguous in nature, while less rich media, such as unaddressed flyers, can be used for more straightforward communication because feedback is slow, physical cues are absent, and it is not addressed to anyone in particular (Daft et al., 1987).

Carlson and Zmud (1999) further extended media richness to include social influence and individual experience with a communication medium to explain how they influence preferences for use of a communication medium. As communication media have evolved in the digital age, empirical studies have sought to determine the role of media richness in rapidly emerging and quickly evolving technologies to determine their influences on education, friendship, and organizations (Ishii et al., 2019). The digital age has informed media richness related to recruitment because traditional lean mediums, such as websites, can be personalized and made richer according to the preferences of prospective employees (Frasca & Edwards, 2017). One study examined the interactivity of online recruitment sites and found information recall was

higher for participants who used a leaner site with less interactivity than a richer site, indicating retention of information about an organization was not always associated with a more interactive online interface, possibly due to cognitive load (Badger et al., 2014). Another study examined elements of media richness of a recruitment website, Facebook page, and YouTube video all containing the same information. Findings revealed respondents viewed the YouTube video to obtain the most information and Facebook to obtain the most language variety, both factors that influence the affective feelings and informational credibility job-seekers associate with a prospective company (Frasca & Edwards, 2017).

While studies have examined media richness as it relates to employee recruitment from a hiring perspective, literature related to media richness and university recruitment is limited. In order to adequately determine the communication medium and its richness necessary for a particular message, communicators should first explore the audience's existing media use patterns (Waters et al., 2009). Therefore, this study sought to identify the media use of successful CAES graduate students when searching for graduate programs to assess the richness of each medium for their intended use and inform future communication strategies. The present study is in alignment with Priority 3 of the national research agenda for the American Association for Agricultural Education (AAAE): Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century (Stripling & Ricketts, 2016).

Purpose and Research Question

The purpose of this study was to explore the influence of media richness in the recruitment process for prospective CAES graduate students. The following research question guided the study: What communication channels are prospective CAES graduate students using to interact with graduate programs during the recruitment process?

Methodology

This study sought to examine the communication preferences of successful CAES graduate students. The University of Georgia was selected due to its profile as a top 10 Land Grant University and diversity of departments within its CAES. To identify the right participants, most successful graduate students, University of Georgia CAES administrators requested the name and contact information of two successful graduate student researchers from each CAES department head – one domestic and one international student – because the larger study sought to understand communication preference differences based on various cultural perspectives. Using Institutional Review Board (IRB)-approved language, the primary researcher emailed each of these students and invited them to participate in the study. Of the 23 CAES students invited to participate in the study, 19 consented to participation. Nine participants were international students, and 10 were domestic. All participants were full-time graduate students receiving assistantship funding and conducting research on the primary or satellite university campus.

Semi-structured interviews were selected because they allowed the researchers to elicit deep conversations with participants about personal and social experiences (DiCicco-Bloom & Crabtree, 2006). One interviewer – the first author - conducted all interviews to ensure consistency. The recruitment process and interview guide were reviewed by experts in graduate

student recruitment, learning strategy and science communication. The protocol was then approved by the University of Georgia IRB (Protocol # 00004686).

The interviewer first questioned participants about their personal and educational backgrounds and current research. With the principles of media richness in mind, the second portion of the interview guide prompted participants to reflect on their communication practices and preferences in their search for prospective graduate programs, not limited to the University of Georgia. Follow-up prompts were used to encourage participants to reflect further on their experiences, allowing researchers to gain a deeper understanding (Seidman, 2006). A list of communication channels was not provided, but participants could ask the interviewer to provide examples for further clarification. Each interview lasted an average of 60 minutes and was audio recorded. Thirteen interviews were conducted in-person, and six were conducted over Zoom with video enabled. The interviewer offered to meet with each participant in-person, but Zoom participants ultimately elected the online video interview option. Participants were ensured only the audio portion of the interview would be retained in order to maintain confidentiality issues associated with online video-recorded interviews. Participant were assigned a pseudonym for their personal protection and confidentiality (Coffelt, 2017).

At the completion of data collection, audio recordings were transcribed verbatim using a third-party service and imported into MAXQDA, a data analysis software, for content analysis. Data were analyzed using inductive analysis which categorizes text in a data-driven manner, identifying patterns and themes within the data, allowing for the emergence of relationships between the patterns (Creswell, 2007). A single coder (the interviewer) coded each of the interviews manually and created an audit trail along the way to establish integrity and credibility (Lincoln & Guba, 1985). The coder participated in peer debriefing with the second author who had expertise in social science and science communication in order to establish reliability, decrease bias, and ensure rigor (Barber & Walczak, 2009; Lincoln & Guba, 1985). Based on the peer debriefing sessions, the lead coder consolidated the codes into groups, resulting in the themes and subthemes discussed.

Bias may exist in qualitative analysis. To increase trustworthiness, bracketing in the form of subjectivity statements was used to acknowledge the backgrounds of researchers and how they may have influenced analysis (Creswell, 2007). The first author, sole interviewer, and sole coder was a graduate student at the University of Georgia enrolled in CAES and recruited into her program by her advisor after the two worked together in a professional capacity. A resident of Georgia her entire life, the first author considered her own graduate recruitment experience when conducting the qualitative analysis. The second author, second coder and peer debriefer, has been a faculty member for 12 years, five at the current university and seven at a previous institution deemed as aspirational. She has advised masters and doctoral students at both universities and served on committee/as a co-advisor with students in four CAES departments outside her own. She reflected upon her own graduate school search as well as the recruitment of the 50+ graduate students she has advised.

Results

Throughout the interviews, participants recalled a multitude of communication channels that fell into three primary themes: online, indirect, and direct communication channels. For the purpose of this article, themes are organized from lean to rich, but the emergence of the themes does not reflect hierarchy of one theme above another. Online channels were those that existed exclusively online and were listed specifically for their useful features, while indirect communication channels involved sources that had online components but were not valued for their online features. Direct communication channels resulted in rich communication with specific individuals and were often discussed for their capacity to connect and form relationships with individuals.

Online Communication Channels

Communication channels were a prominent theme that occurred. To qualify as online communication channels, these were explicitly listed as taking place online, as opposed to other indirect communication channels. Subthemes included departmental websites, lab websites, and research databases and social media.

Departmental Websites

First, participants cited deep dives into departmental websites in their searches to identify graduate programs, promising departments, and faculty researchers who shared research interests. Sara emphasized a departmental website's importance,

The department website is the most authentic source [of information] ...because you see it as the most legit source of knowing about what's going on with the department, with professors, what kind of student is making progress, and this and that.

Participants found graduate expectations outlined on the websites useful. They mentioned browsing graduate handbooks and course offerings published on websites to achieve a firm grasp on the shape of a graduate program. Kimberly was worried about the transition to graduate school. She said, "I looked a lot at the graduate handbook and checklists just to kind of see... I didn't really know what would be expected of me."

Participants were especially interested in the setup of departmental websites to gain information about faculty research interests. Eli said:

When I choose a field of interest, it means that I want to be a scholar in it, and I want a superior that is already in that field that will guide me. It is important for me to identify that there are at least three professors doing that kind of work so that they can guide me.

Assisting Eli in his search of faculty were lists of faculty research interests on departmental websites, followed by the faculty biographies, listing their specific interests and publications. Participants repeatedly mentioned faculty biographies as solidifying their choices to reach out to those faculty members based upon the contents of a faculty curriculum vitae.

The format of the website was repeatedly mentioned as useful (or frustrating) in the program search, with several participants praising specific departmental sites for user friendliness and detailing beneficial web formats. Lorelai stated her preference for the ideal website workflow:

I think the most efficient website that I prefer is that you have this departmental website and then you have a column where it's about the research interest or say the research

group within this department. And then you go down to the list to look at those different sections of the research group or the research areas. They are normally pretty general. Probably four or five sections. And then you chose one of the sections that you're specifically interested in and click into that.

Advertisement of funded positions on the website is what convinced some participants to apply to programs. Allie confessed her exploration of funding opportunities solidified her application decision. "I, on the department website, saw that master students were funded like PhD students in many cases, which is very rare. So that was my hook of being like, 'I'm definitely going to apply here.'" Charles said, "If the department homepage has information about who has a funding or who's looking for a student, then definitely a student is going to apply."

Lab Websites

To learn more about the research of faculty members, several participants listed, as Natasha said, "independent lab websites, which were usually listed on the university's website under that particular PI." Participants continually raised conversations about lab websites of faculty members in which they were interested. Lacy said, "Maybe it's because I'm a millennial and grew up in the digital era, but I do like getting a sense of what the lab prioritizes by what they have on their website." Matt mentioned that he was interested in certain technologies and found the lab website was useful tool for determining if the lab offered innovative opportunities, while Allie said she searched on the lab websites because she wanted a specific type of researcher within her program who would help her continue to study area she was already enjoying. Allie recalled that on the lab websites, "You could look at what they're working on now or what they were looking for grad students to work on with."

Research Databases and Social Media

However, participants were willing to search for faculty research interests beyond those listed on lab or departmental websites. Karter said, "So as someone who's interested in research, I looked at those avenues like ResearchGate and Google Scholar, departmental websites, people's CVs." Participants regularly listed Google Scholar as an information source about prospective faculty mentors. They also mentioned LinkedIn or Twitter. For example, Jack said to gain more information about the department and school he was considering, he looked at "both the departmental as well as the school's actual social media feed." Older participants mentioned their specific use of Facebook. Leah said,

Because I'm a Gen X, I only have Facebook, I don't have Instagram. I looked on the [Department] Facebook, and then the professors. Some professors have a Facebook account, too. I looked on their accounts, making sure that they're okay.

Participants indicated they found the videos created by the university or by CAES on departmental websites or social media to be useful in painting a picture of research culture. Nate stated, "From what the video showed, it seemed like UGA professors and students were really on the leading edge in all fields of what they're researching. That's where I wanted to be – beyond the front lines of what's coming out." Participants also employed social media to establish initial contact with current students in order to gather information from current students about the prospective institutional fit. Lacy, who searched for Facebook groups of current grad students at

prospective universities, said, “You can't really get the feel of it until you've talked to someone who's actually worked there...And you only really get that by talking to people, or at least watching what they post.”

Indirect Communication Channels

Participants consistently identified the theme of indirect channels they used to communicate with prospective faculty and departments, though the indirect channels were not exclusively online and could be considered channels generally related to academia.

Professional Networks and Societies

The first prominent indirect communication channel was professional networks. Josh recalled his experience in finding assistantship funding as one directly related to an academic society, “It was just an email that was sent to a lot of students from the Society of [Discipline] with this job opportunity or graduate assistantship opportunity. And so I decided to apply.” Professional networks and organizations played a role through indirect communication channels because of their ability to provide information about university rankings and reputation. Eli said, “The communication most useful is the ranking of the department.” Charles echoed this sentiment. He said, “If the university itself has a reputation, it doesn't matter. Whatever you do, even they don't advertise their program at all, everyone just comes.” The reputation of the department preceded itself in Yvette’s experience. She heard from professors at her previous institution who encouraged her to apply because of the research reputation of her advisor and the department itself. “They said it’s a really good opportunity because UGA has a good facility, a large farm, which is really rare for a lot of universities to have this size.... And it’s a really good opportunity for applying science and also for research science,” Yvette said.

Journal Articles

Participants used journal articles and information databases to explore faculty research interests, university research priorities, and research methods. Charles said, “Definitely reading an article is the way... a graduate student usually starts their degree with their interest. Therefore, it's really necessary to read their potential advisor's manuscript or a general article before they join.” Participants mentioned becoming familiar with faculty members thanks to reading their work in the field. When speaking of a prospective advisor, Oliver said, “I know the name from the papers, and he is one of the most popular guys in the area.” In some cases, participants used journal articles to evaluate the quality of the research and methodology the faculty members were using. Rachel said, “So if they are publishing to high impact journals, or if I think they had good research methods, that's something that I'm looking for to see would they be a valuable source to help me build my research projects.”

External Community News

Participants mentioned the use of external sources to explore the surroundings of the university community and the benefits or pitfalls of joining it. Jack said of his external media search,

I did do a lot of internet searches just to check out everything in the area, as well. So not just the university, but [City], what was [City] like? What was the temperature like? I had to check the temperature 'cause I'm coming from a tropical country. It's a little bit too cold for me sometimes.

Participants used indirect news communication to learn about the public recognition of departmental research. Natasha said news articles about departmental faculty impressed her.

There's one faculty member here in our department...She's very well known. And so, she's all over social media, the news, et cetera. So just reading that gave, I guess, some presence of UGA in the news, and seeing that was really cool.

Direct Communication Channels

Finally, the theme of direct communication channels, encompassing digital and interpersonal connections participants used to explore potential graduate programs. These channels were those in which participants would directly reach out to key players within the target departments to gain more information about the graduate program.

Professional Network Connections

Participants recognized connections from previous institutions as instrumental in their choice of faculty advisors to pursue. Nate said, "Different managers and bosses would know people in the areas ... The same names started popping up overall. So those were the ones that I wanted to really seek after." Eli identified the use of personal networks to find strong faculty advisors after vetting potential programs. Eli said of the process,

So once a potential applicant restricts the list of people they're interested in, then they usually talk to their own professors just to ask if those professors that they're potentially interested in are known...It's just that you want some validation, 'Oh, have you heard about these people? I think that in this school they're this.'

Participants also leveraged existing connections to find faculty members who could be a match. As a student who had also obtained her undergraduate degree at UGA, Kimberly recalled her experience emailing with a professor with whom she had worked in the past, "I initially asked him if I could work with him. He said he was retiring and pointed me in the direction of my current PI. And I emailed him." Victoria, a student looking to expand upon her undergraduate degree and needing further expertise in the field, found her industry mentors helpful. She recalled, "I definitely asked [my mentors] whether they thought it was a good idea to pursue a graduate degree, and also a little bit of what their personal experiences were."

Participants mentioned the interpersonal connections formed at research conferences, thanks in part to existing faculty relationships. Nate was searching for graduate programs with little luck hearing back from other schools but had a conversation during a conference graduate fair with a UGA faculty member, who in turn had him fill out an interest form. In the early hours of the morning, he heard back from a professor with interest and funding information. Nate said, "At 3:00 AM the next morning I got an email from Dr. [Faculty Advisor] stating, 'I've got a spot. I've got a position. What are you looking at doing? Here's what I can offer. Let's talk.'" He was especially influenced by the speedy nature of the communication from his now-advisor.

Conversations with Existing Students and Alumni

Participants enthusiastically recalled the importance of personal conversations with fellow students to gain information through interpersonal communication – online, over the phone, or in-person. Rachel detailed her conversation with a current student about a potential faculty advisor. “I went to the graduate student I was working with at the time and she had some experience with [Faculty Advisor], said that he was a great option. I think I just took her word for it,” Rachel said. However, it was not simple for many students to find current or recent alumni who would provide helpful insights. This problem presented a particular obstacle for those who had never visited the university’s campus. Allie said of her experience,

I did reach out to current students, just based on their emails on the web pages of the department websites for several programs after I applied...just to learn more about the schools... I'd email students and sometimes I'd get one response and then drop off or something like that. So it was harder to get in touch with current students, I found.

Further challenges arose when departments did not list the names or email addresses of current graduate students, leading some determined participants to dive headlong into creative contact methods. Sara detailed her process.

It was actually a little tortuous. So what I would do is go to the department website, look at the professor's publications and there I would see which student's name appears on the paper or the article. And then I would use that name to find them on the social media.

Email Communication

The communication channel overwhelmingly repeated by participants was email communication. Participants spoke about emailing with faculty advisors, lauding open communication and fast replies as the most valuable, followed by emails useful in providing basic information about the program application process. Kimberly emailed the graduate coordinator to gain direction in her faculty advisor search. She said, “That was nice to have the graduate coordinator actually email me back and say, ‘If this is what you're interested in, here are three people to reach out to.’”

Participants most frequently spoke about their emails with potential faculty advisors. Nate said, “It was primarily just the email communication back and forth. I could tell he really wanted me to come down here and visit and that he really was concerned about my future.” Email was especially impactful for the international participants who were not able to easily call and navigated time zone differences. Lorelai mentioned her diligence in replying to all emails within 24 hours because of the time difference between the United States and China. Matt, also an international participant, appreciated email’s convenience and lack of expense.

So since I was back home, [email] was the best way to communicate. And I used to get a bunch of responses from different professors and then I used to narrow it down whether I would apply to that program or not and then push the communication forward.

Phone or Video Calls

Participants were likely to utilize phone or video calls to further relationships with prospective advisors after establishing an email connection. Tonya remembered she first spoke with professors in her undergraduate department, then emailed her current advisor when she

discovered the graduate research opportunity, recalling that technology did not, in her opinion, play a prominent role in her decision to attend the graduate program. Tonya said, “And then after that, it was all phone calls.” Other participants used a combination of phone and video calls to gain information about their programs. Victoria said, “Maybe a little bit of phone call too, depending on, I think, whether they were responsive to the email or whether I had additional questions that would be easier to answer over the phone.” Yvette also cited using phone calls as a measure after making an initial connection with current students or recent alumni of the department. She said, “Social media and Facebook messenger is how I get in touch with them. And after that, I just say, ‘Hey, can I call you really quick?’”

Leah said Zoom video conferencing was the most useful tool to gain information about the program. “I asked [the professors] personally if they aligned to what I want to happen in the future,” Leah said. Allie recalled utilizing Zoom calls to keep in communication with potential faculty members following her campus visit.

I got to get on a Zoom call with one [professor] after the visit, really right before I ended up making the decision, at which point she offered me more funding to work on this research with her. And then right after making the decision I got on a Zoom call with them to learn just more about the project I'd be on in general.

In-Person Visits

Participants were likely to list in-person campus visits as instrumental in their decision to attend the institution. For example, Rachel said her in-person visit to students on campus provided her with personal insights.

I guess when I was talking to students, that was more of what's their perception of their PI? So do they enjoy working in the group? Are they working? Is their work-family balance good? That's something that I value. Does their PI offer them a lot of support or guidance? Less so about the research, but more about the interpersonal relationship.

Several students remembered feeling welcomed by faculty and confident in their decisions to attend the university after campus visits. Karter recalled her campus visit as one that helped her feel valued by the graduate coordinator in the department.

He took me and my partner to lunch and we sat in on one of his classes...And even though I've never taken that class, it was really exciting to feel that a graduate coordinator cared enough to take me and my now-husband to lunch, get to know us, let us sit in on his three-hour class, see part of [City] as well.

Conclusions, Implications, and Recommendations

Conclusions

Recruiting graduate students into highly specialized programs within CAESs is no small task but is necessary given the demand for employees with graduate degrees within the agricultural workforce (Chakraborty et al., 2017). To communicate most effectively with prospective successful graduate students, it is necessary to first understand their current uses of media (Waters et al., 2009) and the richness which is required to communicate with this audience at different stages throughout the graduate recruitment process. Findings revealed students within

this study started with lean, indirect and online channels with less personalization and moved into richer media such as email, calls, and in-person visits with capacity for immediate feedback as their interest in the institution grew. The more interested a student was in an institution, the richer the communication media they sought, aligning with media richness findings that imply the importance of using multiple communication channels to achieve a desired outcome (Ishii et al., 2019).

Implications

Generally, participants started with lean communication channels to assess the possibility of obtaining a graduate degree. Participants had strong preferences as to the setup of departmental websites, indicating they found the stated research interests of faculty members useful in their searches to narrow down potential advisors. Once participants identified advisors with research interests similar to their own, they were likely to look into faculty biographies, CVs, or lab websites. Therefore, departments within CAES should consider both the structure of their websites and keywords they use to highlight faculty interests. Participants indicated disappointment when the information was not up-to-date. Emphasizing the importance of regular maintenance of these pages to attract successful graduate students may encourage faculty to prioritize this task. Also useful as an online resource was the departmental graduate handbook, as it provided students insight into course availability and what to expect from a graduate student experience as they sought richer, more personalized information. Therefore, departments should keep current handbook copies on departmental websites to help students best understand the processes of the department – from admission to graduation. However, Badger et al. (2014) found higher information retention when a site was not highly interactive, indicating departments should prioritize keeping sites lean to increase information retention for prospective students.

Lab websites were more personalized for by lab and, therefore, richer than departmental websites. Lab websites exhibited similar characteristics as lean sources of information that outlined lab research projects, priorities, and available technologies. Because students sought aspects of labs that were personal to their interests, future research may examine elements of a website that appeal to prospective graduate students' desire for personalization. Future studies should determine what lab website elements appeal to prospective students with specific career aspirations, degree levels sought, or needs for funding – all of which are influential in graduate program choice (English & Umbach, 2016; Hardré & Hackett, 2015; Shellhouse et al., 2020).

Journal articles, a lean form of media with little room for interactivity, featured prominently in potential graduate students' searches to inform them about the research interests, research methods, and ethics of potential faculty advisors. Overall, students were very pleased when faculty emailed them documents of current work to help them understand the current research happening in the lab. Future research should explore the response rates and media richness perceptions of prospective graduate students who receive email faculty replies with current journal articles versus those without. In practice, departments may benefit from training faculty to email current work to prospective students, as well as display a lab's most current journal articles prominently within departmental faculty profiles.

Popular press articles and general community news – though lean forms of media – were useful in fulfilling students' needs to understand the community in which the university was located.

This aligns with the media richness tenet that a lean form of media was selected for straightforward communication (Daft et al., 1987). Departments may consider focusing on public relations with local media to highlight local importance of departmental research.

Research databases and social media helped connect students to current disciplinary research and find prospective faculty advisors. Students mentioned learning more about potential faculty advisors through following Google Scholar coverage. Google Scholar, a relatively rich medium with potential for immediate feedback and personalization (Daft & Lengel, 1986), should be utilized by departments to keep faculty research profiles current and be linked to departmental websites for ease of use. Social media platforms were used by participants to gain a clear picture of the university more personalized to their interests. Participants were likely to use social media to seek rich communication by reaching out to current students to receive immediate feedback, cues through language, personalized information, and natural conversation about their experiences in the graduate program. These findings are in alignment with the importance of rich media in relational contexts (Ishii et al., 2019).

To this end, participants indicated a preference for departmental websites with contact information of current or recently graduated students. This readily available information empowered participants to connect with and understand the experience of students already ensconced in the graduate program, adding to the potential for richer communication through increased interactivity and immediate feedback. Departments must consider the privacy and online communication preferences of the graduate students they serve. There are legal policies, such as the Family Educational Rights and Privacy Act (FERPA), that protect student information. Within legal confines, departments should consider maintaining a list of current and recently graduate students to display their accomplishments and contact information. Future research could track engagement with sites containing current student information against sites without it to inform the interactions elicited by student profiles.

Professional societies provided relatively rich, personalized communication and served multiple purposes for participants to engage throughout their program search processes. Professional societies shared information about assistantship opportunities, connected participants with advisors through conferences, and served as mechanisms for faculty socialization, displaying a variety of media richness through their channels. These societies work well to engage students who are already in their disciplinary areas and provide in-person connections that may fail to be fruitful over email, but departments should not focus all of their communication efforts within traditional societies if they wish to attract students without traditional backgrounds. Future studies would benefit from surveying graduate students about their use of professional societies in identifying graduate programs and the frequency of using professional society resources.

Rich communication with the potential for immediate feedback – over the telephone, through video calls, or in-person – was instrumental. Participants tended to use spoken communication channels to gain more confidence in understanding the culture of a university or a lab through asking personalized questions and picking up on language and social cues in these interactions. Participants who spent time in direct contact through phone, video call, or in-person communication were able to gauge the personality of faculty and students to understand their feelings about research and the department, particularly through body language cues and the use

of natural language, aligning with the media richness theory suggestion that rich media is more effective for sharing information that could be ambiguous (Daft et al., 1987). Phone and video calls were inconvenient for students located in other countries because of time zone differences and unreliable internet connections, while resources to travel to the U.S. also inhibited their ability to visit in-person. Despite these issues, faculty and students of a current department should make every effort to connect with spoken communication to secure potential graduate student interest using rich communication media.

Recommendations for Future Research

Participants' descriptions of their unique personal experiences indicated CAES graduate recruitment should be focused on a holistic approach to satisfy multiple, specific needs of prospective students through a variety of communication channels – moving from lean communication media at the beginning of the search to rich spoken communication as prospective students make their decisions. However, the study was limited to graduate research students at the University of Georgia and is not generalizable to the larger prospective graduate student population. Additionally, the differences between international and domestic students' preferences for media use and the richness thereof should be further examined to determine if differences exist and how universities must strategically communicate with each of these crucial prospective student populations. Therefore, future research should quantitatively examine frequency of use of communication channels and the nuances that exist depending on demographic, psychographic, and cultural variables of prospective students. The results could be used in the strategic, evidence-based training of faculty members across institutions to create communication materials that meet the variety of needs necessary to recruit successful graduate students while keeping the principles of media richness in mind.

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Oklahoma School Superintendents Perceptions Toward School-Based Agricultural Education

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Superintendents play a key role related to influence and decision making at the school building level. This study aimed to determine the perceptions of superintendents across Oklahoma related to school-based agricultural education (SBAE). The Theory of Reasoned Action and Planned Behavior undergirded this study. This non-experimental descriptive research study aimed to reach school superintendents across Oklahoma who had one or more SBAE teachers in their district (N = 367). The 35-item instrument spanned three constructs including, SBAE program perceptions, SBAE course perceptions, and SBAE teacher perceptions, along with personal and professional characteristic questions. Nine items represented the construct of SBAE program perceptions, which resulted in a grand mean of 3.36. The second research objective measured superintendents' perceptions of SBAE courses, resulting in a grand mean of 3.29, with mean scores ranging from a low of 1.42 to a high of 3.65 on a five-point scale. The final construct aimed to establish superintendents' perceptions of SBAE teachers across Oklahoma, of which participants held a positive perception overall (grand mean = 3.26). Although this study has been replicated in three states with similar outcomes, additional research is necessary to determine administrator perceptions in states with perhaps less agricultural support.

Introduction

“Superintendents are highly visible actors in the American education system” (Chingos et al., 2014, p. 1). Although school structures vary, superintendents play a key role related to influence and decision making at the school building level (Whitt et al., 2015). Administrators at this level are often thought to have visionary leadership ability, community leadership and advocacy skills, and a belief that all children can learn (Usdan et al., 2000). Regardless, school leaders worldwide are facing new and increasing challenges to effectively support teachers and prepare students (Organisation for Economic Co-operation and Development, 2009). Even though superintendents are not responsible for every process, decision, or initiative, they are the highest ranked official within a district and receive much of the credit on good days and plenty of blame on the bad ones (Chingos et al., 2014).

The perceptions of superintendents related to core content (Peterson et al., 1987), teacher effectiveness (York-Barr & Duke, 2004), specific district initiatives (Hornbeck & Malin, 2019), and leadership (Wells, 2012) has been investigated, but their recent perceptions specific to school-based agricultural education (SBAE) are lacking. Furthermore, superintendents in Oklahoma are often tasked with the hiring of SBAE teachers and head football coaches (Personal Communication, 2022), therefore their perception becomes even more important considering the role they play. This study aimed to determine the perceptions of superintendents across Oklahoma related to SBAE.

Specifically, this study replicated research conducted in Iowa (Kalme & Dyer, 2000) and Florida (Smith & Myers, 2012) which evaluated the perceptions of secondary school principals toward

their SBAE programs. Statewide studies conducted in Florida and Iowa found secondary school principals to hold positive perceptions of SBAE programs, courses, and teachers (Kalme & Dyer, 2000; Smith & Myers, 2012), but there is currently no data outlining the perceptions of administrators related to SBAE programs in Oklahoma. With nearly 70% of comprehensive K-12 school districts across Oklahoma having SBAE programs (Oklahoma State Department of Education, 2022), the perceptions of those programs are essential to consider. The comprehensive SBAE program includes classroom and laboratory instruction, student engagement within the National FFA Organization, and supervised agricultural experiences (SAE) for students enrolled in the programs (National FFA Organization, 2018).

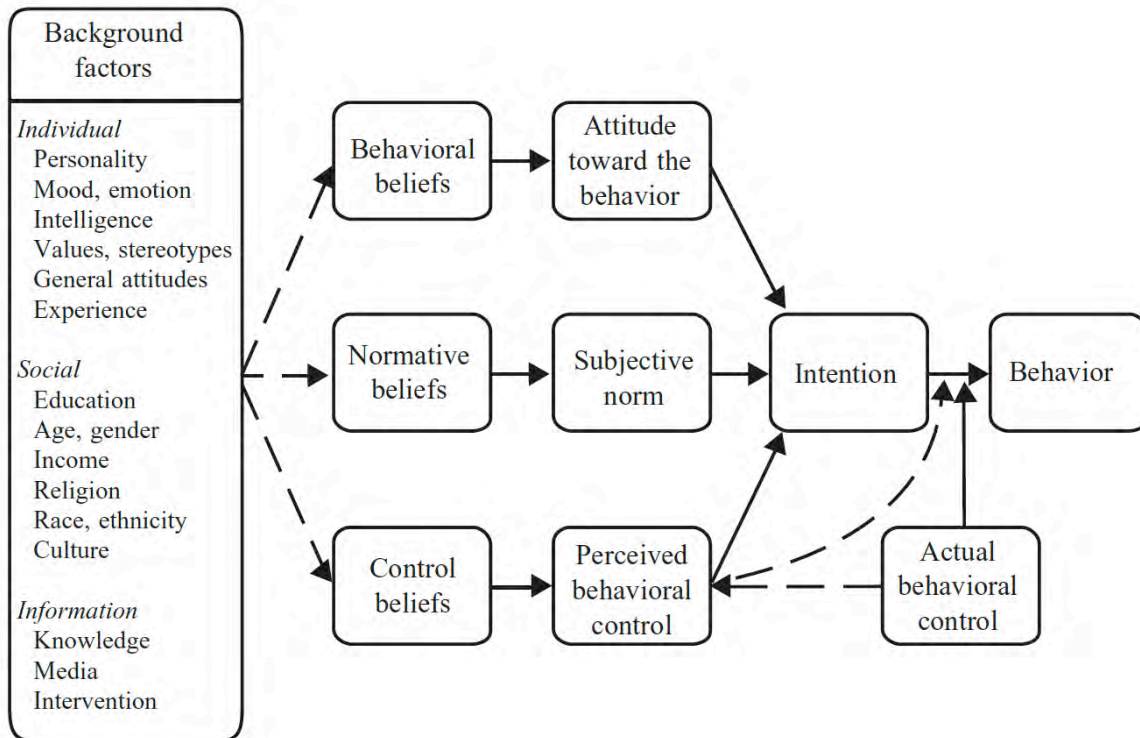
Moreover, the connection between SBAE teachers and school administrators has been identified as an essential component of program success (Talbert et al., 2007). This success extends beyond travel and program funding (Talbert et al., 2007), as student achievement is often increased by the implementation of a complete SBAE program (Cheek et al., 1994). Much of this success is related to the connection of science across the complete SBAE program (McKim et al., 2017). It is essential for SBAE teachers to be engaged across the three components to offer a comprehensive program for students to be considered an effective SBAE teacher (Eck et al., 2021). This becomes even more important as you consider the connection between administrators and teachers through the annual evaluation process, which teachers desire to allow opportunities for growth and development (Hopkins, 2016). The National Council for Agricultural Education (2012) defined SBAE as “a systematic program of instruction available to students desiring to learn about the science, business, and technology of plant and animal production and/or about the environmental and natural resources systems” (para. 1). Overarchingly, administrators across states have been identified as having positive perceptions of SBAE programs, courses, and teachers (Kalme & Dyer, 2000; Smith & Myers, 2012), but how has the recent decline in student enrollment, troubling retention rates, and an alarming number of teachers leaving the profession (Nguyen & Springer, 2019) impacted administrators’ perceptions of SBAE?

Theoretical/Conceptual Framework

“It has usually been assumed that a person’s behavior with respect to an object is in large part determined by his attitude toward that object” (Fishbein & Ajzen, 1975, p. 335). The Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Theory of Planned Behavior (Ajzen, 1991) undergirded this study, as SBAE programs in Oklahoma served as the object of interest. Specifically, superintendents’ behavior related to SBAE programs, SBAE courses, and SBAE teachers could be predicted by evaluating their attitudes and subjective norms (i.e., perceptions) of each component (Fishbein & Ajzen, 1975). Figure 1 connects the two theories together based on Ajzen and Fishbein’s (2005) work.

Figure 1

The Theories of Reasoned Action and Planned Behavior (Ajzen & Fishbein, 2005)



Purposely, within this study the researchers were able to consider the background factors of the superintendents (i.e., personal and professional characteristics) to determine their beliefs (i.e., behavioral, normative, and control) related to SBAE programs, courses, and teachers using a previously developed instrument (Kalme & Dyer, 2000). Identifying the beliefs of superintendents in Oklahoma allows the researchers to explain the determinants of their intentions, i.e., attitude toward the behavior, subjective norm, and perceived behavioral control (see Figure 1; Ajzen & Fishbein, 2005). These determinants have the potential to influence the superintendent's intention and behavior (Ajzen, 1991) as it relates to SBAE programs in Oklahoma. Together, these factors potentially impact a superintendent's decisions related to programmatic needs, including funding, travel, resources, and support (Talbert et al., 2007).

Purpose of the Study

The purpose of this study was to determine Oklahoma superintendents' perceptions toward SBAE in their district. Four research objectives guided this study:

1. Determine the perceptions of school superintendents toward Oklahoma SBAE programs,
2. Ascertain the perceptions of school superintendents toward SBAE courses,
3. Establish the perceptions of school superintendents toward SBAE teachers, and
4. Compare the perceptions of school superintendents based on personal and professional characteristics.

Methods and Procedures

This non-experimental descriptive research study aimed to reach school superintendents across Oklahoma who had one or more SBAE teachers in their district ($N = 367$). To reach the target population, an existing email frame of Oklahoma superintendents was utilized, of which 14 emails bounced back undeliverable, adjusting the accessible population to 353. An initial email requesting participation was sent followed by four reminder emails following the recommendations of Dillman et al. (2014) to maximize response rate. In all, 185 complete survey instruments were returned, resulting in a 52.4% response rate.

The instrument distributed in this study was based on previous research from Kalme and Dyer (2000) who identified the perceptions of secondary school principals with SBAE programs in Iowa. Although their previous study was state specific, the items were relevant to administrators at large and considered to be reliable and valid based on item development, pilot testing, and instrument distribution (Kalme & Dyer, 2000). Specifically, the 35-item instrument, spanning three constructs, i.e., SBAE program perceptions (9-items), SBAE course perceptions (11-items), and SBAE teacher perceptions (15-items), provided an acceptable Cronbach's alpha of .63, .83, and .89 respectively (Nunnally, 1978). In addition to the 35-item instrument, superintendents were asked five questions related to their personal and professional characteristics (i.e., age, years as superintendent, school district size, number of SBAE teachers in district, and number of SBAE teachers they have hired as superintendent). Table 1 outlines the personal and professional characteristics of the participants.

Table 1

Oklahoma Superintendents Personal and Professional Characteristics (n = 185)

Characteristic	<i>f</i>	%	
Age	36 to 40	6	3.2
	41 to 45	9	4.9
	46 to 50	25	13.5
	51 to 55	39	21.1
	56 to 60	31	16.8
	61 to 65	14	7.6
	66 to 70	3	1.6
	71 or older	3	1.6
Prefer to not respond	55	29.7	
Years Serving as Superintendent	First Year	4	2.2
	2 to 5	47	25.4
	6 to 10	50	27.0
	11 to 15	32	17.3
	16 to 20	9	4.9
	21 to 25	5	2.7
	26 to 30	8	4.3
Prefer to not respond	30	16.2	

School District Size	C	8	4.3
	B	28	15.1
	1A	27	14.6
	2A	44	23.9
	3A	13	7.0
	4A	20	10.8
	5A	8	4.3
	6A	7	3.8
	Prefer to not respond	30	16.2
Number of SBAE Teachers in District	1	103	55.7
	2	40	21.6
	3	12	6.5
	Prefer to not respond	30	16.2
Number of SBAE Teachers Hired as Superintendent	0	34	18.4
	1	47	25.4
	2	28	15.1
	3	17	9.2
	4	17	9.2
	5 or more	12	6.5
	Prefer to not respond	30	16.2

Participants were asked to rate each of the 35 items on a five-point, Likert-type scale of agreement ranging from 1 (strongly disagree) to 5 (Strongly agree). To further understand participant perceptions based on mean scores, the following scale was established based on previous research using the instrument (Smith & Myers, 2012): 1.00 to 1.49 = negative perception, 1.50 to 3.49 = neutral perception, and 3.50 to 5.00 = positive perception. To gauge overall participant perception (i.e., positive or negative), the grand mean for each construct area was calculated. If the grand mean for the construct area was above 3.0, the perception was considered positive. Adversely, if the grand mean fell below 3.0, the perception was negative. Descriptive statistics were analyzed using SPSS Version 28. Although this study resulted in a 52.4% response rate, non-response error was still of concern, as the research team aimed to generalize to population of superintendents in Oklahoma with SBAE programs (Fraenkel et al., 2019). Therefore, the research team compared early to late responses based off the recommendation of Lindner et al. (2001). Respondents were classified by responsive waves, specifically 140 participants were deemed early respondents, while the remaining 45 were late respondents (i.e., responded after the final reminder). The personal and professional characteristics and composite SBAE perception scores of early and late respondents were compared, resulting in no differences. Additionally, the percentage of respondents were compared to Oklahoma data related to school district size (i.e., C to 6A) and number of SBAE programs per district. The resulting comparisons were found to be comparative, further demonstrating the participants in this study as a representative sample of superintendents with SBAE programs in Oklahoma.

To determine superintendents' overall perception of SBAE in Oklahoma, a composite SBAE perception score was calculated using Microsoft Excel. Specifically, the self-reported ranking (i.e., 1 [strongly disagree] to 5 [strongly agree]) from each of 35-items (i.e., program, course, and teacher perceptions) was summed to determine an overall perception score. Each item was equally weighted, per the recommendations of McDonald (1997) who determined that equally weighted items provide the optimal estimate when combining scores across components. Perception scores had a potential range from 35 (very negative perception) to 175 (very positive perception).

In addition to Microsoft Excel, IBM SPSS Statistics Version 28 was utilized to analyze the data per the stated research objectives. Composite perception scores were analyzed to determine the impact of personal and professional characteristics (i.e., age, years as superintendent, school district size, and number of SBAE teachers they have hired as superintendent). The composite perception score served as the dependent variable, which was compared to the four independent variables (i.e., personal and professional characteristics) using a factorial analysis of variance (ANOVA). Resulting interactions, main effects, and *post hoc* analysis was analyzed from the SPSS output (Field, 2018).

Findings

Research Question 1: Determine the Perceptions of School Superintendents Toward Oklahoma SBAE Programs

Nine items represented the construct of SBAE program perceptions, which resulted in a grand mean of 3.36 after reverse coding of negative statements. Considering the individual items and the grand mean, superintendents' perceptions of SBAE programs in Oklahoma were positive (i.e., mean of 3.5 or higher; grand mean above 3.0). The majority of respondents (69.7%) agreed or strongly agreed that *college bound students should take agricultural education courses*, resulting in the highest mean (3.70). Similarly, 67.4% of participants strongly disagreed or disagreed with *students who take agricultural education courses tend to be less academically able*, resulting in the lowest mean (1.73). Table 2 provides the mean and standard deviation for each of the nine items, which were ranked on a five-point scale of agreement (i.e., 1 = strongly disagree and 5 = strongly agree).

Table 2

Oklahoma Superintendents Perceptions of School-Based Agricultural Education Programs (n = 185)

Item Description	<i>M</i>	<i>SD</i>
College bound students should take agricultural education courses.	3.70	.89
The image of agriculture is improving.	3.68	.55
Students are becoming more interested in enrolling in agricultural education courses.	3.68	1.01

The agricultural education program in my school is a positive force in my community.	3.64	.54
There are numerous opportunities for employment in the field of agriculture.	3.55	.69
The facilities and equipment used in agricultural education courses are adequate and up-to-date.	3.25	.94
Because of increased graduation requirements, there is little time for students to enroll in agricultural education courses.	2.79	1.20
Agricultural education focuses too heavily on the development of specific job skills.	2.44	1.28
Students who take agricultural education courses tend to be less academically able.	1.73	.92

Note. Five-point scale of agreement, 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree.

The first five items presented in Table 2 resulted in positive perceptions from the superintendents (i.e., mean of 3.5 or higher), with the remaining items achieving a neutral perception (i.e., mean of 1.5 to 3.49). It should be noted that the bottom three items (see Table 2) were negatively worded, therefore the mean score presented in Table 2 lends itself toward a positive perception. Additionally, these items were reverse coded for the establishment of the grand mean for the program perception construct.

Research Objective 2: Ascertain the Perceptions of School Superintendents Toward SBAE Courses

The second research objective was measured using an 11-item construct for superintendents' perceptions of SBAE courses. This construct resulted in a grand mean of 3.29, with mean scores ranging from a low of 1.42 (*Agricultural education courses provide little for students' intellectual development*) to a high of 3.65 (*Agricultural education courses encourage students to apply knowledge and skills to real-life problems*) on a five-point scale. The item *Other elective courses are more valuable to college bound students than are agricultural education* resulted in a mean of 2.47 but received the greatest standard deviation (1.28) of the construct, 51.4% strongly disagreed or disagreed and 36.4% agreed or strongly agreed, while the remaining 12.2% remained uncertain. Table 3 outlines the mean and standard deviation of all 11 items related to program perceptions.

Table 3

Oklahoma Superintendents Perceptions of School-Based Agricultural Education Courses (n = 185)

Item Description	<i>M</i>	<i>SD</i>
Agricultural education courses encourage students to apply knowledge and skills to real-life problems.	3.65	.54

Agricultural education courses develop skills needed for employment in business and industry.	3.54	.55
High school agriculture courses are beneficial for high achievers.	3.52	.59
High school agriculture courses are beneficial for low achievers.	3.48	.67
Students enrolled in agricultural education courses seem to enjoy these courses.	3.42	.51
Agricultural education courses reinforce learning in academic courses.	3.42	.64
Agricultural education courses are easier than other courses offered in our school.	2.54	1.13
Other elective courses are more valuable to college bound students than are agricultural education.	2.47	1.28
High school agricultural education courses should be offered primarily in rural areas.	1.93	1.06
Agricultural education courses should be offered in technical schools/centers rather than in high school.	1.45	.76
Agricultural education courses provide little for students' intellectual development.	1.42	.68

Note. Five-point scale of agreement, 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree.

The top three items (see Table 3) resulted in positive perceptions (i.e., mean of 3.5 or higher), while the next six items achieved a neutral perception overall (i.e., mean of 1.5 to 3.49), and the final two items received a mean of 1.49 or lower, which was considered a negative perception per the recommendations of Smith and Myers (2012).

Research Objective 3: Establish the Perceptions of School Superintendents Toward SBAE Teachers

The final construct aimed to establish superintendents' perceptions of SBAE teachers across 15-items (see Table 4). While participants held a positive perception overall (grand mean = 3.26), items such as *agricultural education teachers are more effective in their teaching than most other teachers*, brought about some uncertainty, as 38.6% of participants strongly disagreed or disagreed, while 33.2% agreed or strongly agreed, and the remaining 28.2% were uncertain. Similarly, 24.3% of participants were uncertain, while 32% disagreed or strongly disagreed with *other teachers collaborate with agriculture teachers to integrate agricultural subjects into their courses*.

Table 4

Oklahoma Superintendents Perception of School-Based Agricultural Education Teachers (n = 185)

Item Description	<i>M</i>	<i>SD</i>
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Students are becoming more interested in enrolling in agricultural education courses.	3.66	1.02
Other teachers collaborate with agriculture teachers to integrate agricultural subjects into their courses.	3.66	1.19
Agricultural education teachers collaborate with other teachers to integrate other subjects into agricultural education courses.	3.55	1.08
The agricultural education teacher takes in-service courses, seminars, and other non-credit experiences beyond those required by our school.	3.52	.92
Agricultural education teachers have positive professional relationships with other teachers.	3.51	.71
Agricultural education teachers have positive professional relationships with administrators.	3.51	.70
The agricultural education teacher in my school is a high-quality teacher.	3.50	.70
Agricultural education teachers have positive professional relationships with guidance counselors.	3.49	.79
The agricultural education teacher involves an advisory committee in determining objectives of agricultural education programs.	3.43	1.18
The agricultural education teacher keeps the agricultural education program current to meet employment needs.	3.42	.97
The agricultural education teacher keeps the agricultural education program current to meet higher educational needs.	3.42	.90
Agricultural education teachers are more effective in their teaching than most other teachers.	3.41	1.52
Agricultural education teachers effectively support core content teachers by integrating science, technology, engineering, and math (STEM) in their courses.	3.40	.72
Agricultural education teachers utilize many community members/resources in their class topics.	3.39	.76
Agricultural education teachers do not encourage college bound students to enroll in agricultural education courses.	1.84	1.00

Note. Five-point scale of agreement, 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree.

Nearly half (7 of the 15) of the items resulted in a positive perception (i.e., mean of 3.5 or higher), while the remaining seven were considered neutral (i.e., mean of 1.5 to 3.49). It should be noted that some participating superintendents had more than one SBAE teacher in their school district (see Table 1) which could convolute the decision-making process related to perceptions of SBAE teachers.

Research Objective 4: Compare the Perceptions of School Superintendents Based on Personal and Professional Characteristics.

The overall perceptions of SBAE from Oklahoma superintendents were determined by calculating a composite SBAE perception score across the 35 items. Perception scores had a potential range from 35 (very negative perception) to 175 (very positive perception). This study resulted in composite SBAE perception scores ranging from a low of 113 to a high of 174, with a composite mean of 160.64.

The personal and professional characteristics of superintendents (see Table 1) were compared against composite sum SBAE perception scores. The maximum possible perception score was 175, as each of the 35-items had a maximum Likert-type rating of 5 (strongly agree). The responses were normally distributed and assumption of homogeneity of variance was met ($p > .05$). Therefore, a factorial ANOVA was run using SPSS, with the composite SBAE perception score as the dependent variable and the personal and professional characteristics of superintendents (i.e., age, years serving as superintendent, school district size, and number of SBAE teachers they have hired as superintendent) serving as the independent variable. The analysis resulted in no statistically significant interactions within the factorial ANOVA, leading the research team to evaluate main effects. The four personal and professional characteristics (independent variables) yielded no statically significant main effects: (1) Age $F(7, 149) = 0.44$, $p = .84$; (2) Years Serving as Superintendent $F(4, 149) = 0.61$, $p = .68$; (3) School District Size $F(2, 149) = 0.05$, $p = .95$; (4) Number of SBAE Teachers They Have Hired as Superintendent $F(2, 149) = 0.45$, $p = .67$. Since the analysis resulted in no statistically significant differences, *post-hoc* analysis was not interpreted.

Conclusions, Implications, and Recommendations

Overall, superintendents in Oklahoma held a positive perception of SBAE programs ($M = 3.36$), courses ($M = 3.29$), and teachers ($M = 3.26$), aligning with previous research conducted in Iowa (Kalme & Dyer, 2000) and Florida (Smith & Myers, 2012) where school principals were found to have positive perceptions of SBAE programs, courses, and teachers. This becomes even more important in Oklahoma, as nearly 70% of comprehensive K-12 school districts currently have SBAE programs, while others are on a waiting list to add a program (Oklahoma State Department of Education, 2022). The perception of the superintendents is extremely valuable as they are highly visible administrator within a given school district (Chingos et al., 2014) and play a key role in the decision-making process (Whitt et al., 2015).

Specifically considering SBAE programs, superintendents perceived them to be a positive addition to the school district. SBAE programs were perceived to make a difference by improving the image of agriculture, preparing students for college and careers, and serving as a positive force within the community. Similarly, studies conducted in Florida and Iowa found secondary school administrators to hold positive perceptions of SBAE programs, courses, and teachers (Kalme & Dyer, 2000; Smith & Myers, 2012). Documenting SBAE teachers' ability to make an impact within a complete program becomes increasingly important with this target population considering the common role of hiring SBAE teachers in Oklahoma (Personal Communication, 2022).

SBAE courses were perceived as encouraging students to apply knowledge and skills related to real-life problems, while also developing skills essential for future employment. Additionally,

SBAE programs were seen as beneficial to all students (i.e., high achieving students, low achieving students, and college bound students). These components are part of a complete SBAE program which increases overall student achievement (Cheek et al., 1994; Talbert et al., 2007), in both academics and career skills (McKim et al., 2017).

Additionally, SBAE teachers were identified as being life-long learners who regularly collaborate with other teachers, seek out professional development opportunities, and build positive relationships with other teachers and administrators. The development of these relationships become a valuable connection between the teacher and administrators, ultimately leading to program success (Talbert et al., 2007). Perhaps this trait improves the overall perception from administrators as this dedication to life-long learning furthers the SBAE teachers career specific human capital improving their ability to be effective teachers across a complete program (Cheek et al., 1994; Eck et al., 2021).

The overall perceptions of SBAE in Oklahoma (i.e., programs, courses, and teachers) remained consistent regardless of the personal and professional characteristics of the participating superintendent (i.e., age, years serving as superintendent, school district size, and number of SBAE teachers they have hired as superintendent). This provides valuable insight as previous research has drawn to question the perceptions of administrators with varying personal and professional characteristics (Robinson & Baker, 2013). These characteristics were also conceptualized as individual and personal background factors (Ajzen & Fishbein, 2005). Identifying the beliefs of the participating superintendents in Oklahoma allows the researchers to better understand the determinants of their intentions (i.e., attitude toward the behavior, subjective norm, and perceived behavioral control), ultimately impacting the needs of pre-service SBAE teacher training and in-service SBAE teacher support (Ajzen & Fishbein, 2005).

Could it be that effective preparation of SBAE teachers at the university level plays a significant role in the overall perceptions held by administrators? If so, now more than ever, the need exists for faculty, teachers, and local and state level supporters to work together to support the ever-growing number of alternatively or emergency certified teachers entering the ranks within SBAE programs (Smith et al., 2022). This need is exacerbated by the roles and responsibilities connected to a comprehensive SBAE program (i.e., classroom and laboratory instruction, student engagement through the National FFA Organization, and SAE projects) considering the pathway of most alternatively certified teachers coming from industry or another educational area (Claflin et al., 2020; Rocca & Washburn, 2006).

Much of the positive perception portrayed in this study is linked to the ability of SBAE programs to prepare students for college and careers. An additional component within these 21st century skills that was not directly measured within this study is the need for STEM integration within a complete SBAE program to continue to meet the demand for future college and career success (McKim et al., 2017). Therefore, SBAE teacher preparation programs should evaluate their current preparation of SBAE teacher aspirants to address these needs. This becomes even more important considering the neutral mean score (i.e., mean of 1.5 to 3.49) for the item *Agricultural education teachers effectively support core content teachers by integrating science, technology, engineering, and math in their courses*.

As background factors (i.e., personal and professional characteristics) were considered to impact the beliefs (i.e., behavioral, normative, and control), activities, norms, perceived control, and intentions of an individual toward a behavior (Ajzen & Fishbein, 2005), it is of interest that no statistically significant differences were found based on the personal and professional characteristics of participating superintendents. Therefore, we can conclude that superintendents in Oklahoma will continue to behave in a manner that supports SBAE programs, courses, and teachers, considering the assumption that one's behavior toward something is primarily determined by their attitude toward that item (Fishbein & Ajzen, 1975). These determinants are influential on the given individual (Ajzen, 1991), therefore SBAE teachers must continue to conduct business in a positive manner and serve as advocates for their program on a local, statewide, and national level.

Although this study is limited to the perceptions of superintendents with SBAE programs in Oklahoma, teacher preparation faculty and SBAE stakeholders should consider these findings as potential considerations in the preparation of SBAE teacher aspirants and the support of current SBAE teachers. Additionally, these findings provide valuable insight into the perceptions of the highest rank school official in a given school district (Chingos et al., 2014), which should be considered when working to establish new SBAE programs across the country or develop additional support as budget cuts loom (Leachman et al., 2015).

Specifically, teacher preparation faculty should convey the positive perceptions held by administrators in this study to SBAE teacher aspirants, as a need exists to reframe the conversation surrounding the support administrators provide to teachers (Paufler & Clark, 2019). Furthermore, in-service SBAE teachers, district and state level support staff, and teacher preparation faculty should continue to share the benefits of a complete SBAE program to sustain the positive image currently held by administrators from this study and others (Kalme & Dyer, 2000; Smith & Myers, 2012), especially when new administrators are hired that do not have an SBAE or career and technical education background. Research investigating the administrators' educational background and experience (i.e., certification pathway, certification area, years of teaching experience, and years as an administrator) could help to further understand their perceptions toward SBAE and career and technical education at large.

Although this study has been replicated in three states with similar outcomes, additional research is necessary on a national scale to determine administrator perceptions in states with perhaps less support or emphasis on agriculture. This study also focused on administrators with eighth through twelfth grade programs, additional research should consider perceptions of administrators with middle-grade programs. Future research should also compare teacher, administrator, and community (i.e., parents and stakeholders) perceptions of SBAE programs. Qualitative interviews with administrators would further the understanding of the positive perceptions held and what SBAE teachers do to develop and sustain those positive perceptions. Future research also needs to investigate the impact of current SBAE teachers' personal and professional characteristics (i.e., certification pathway, age, gender, program size, years of teaching experience, and program emphasis) on administrators' perceptions, as these factors could play a role in the perception of current teachers or the hiring of future SBAE teachers.

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4-H Extension Educator's Perceptions on Disability Awareness and Inclusion

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Abstract

The national 4-H organization is the largest youth outreach program that provides youth with leadership opportunities, life skills, and development of community involvement and engagement. Through 4-H, youth are exposed to unique experiences and the chance to interact with others to build relationships, but for youth to feel confident in expressing their originality, youth development professionals must understand differences and exceptionalities to effectively interact with all levels of ability. The purpose of this study was to analyze Kansas 4-H Extension Educator's professional perceptions towards disability awareness and inclusion in the 4-H program and the resources available to them. A twenty-question Qualtrics® survey was distributed to Kansas 4-H extension educators regarding their knowledge and experience with disability in the 4-H program. This study examined the amount of disability awareness training Kansas 4-H extension educators receive and their comfort levels regarding interacting with disability and providing accommodations. Results from this study illuminated how disability is perceived in the 4-H organization and how we can better prepare 4-H extension educators to interact with disability in their career. This study also offers insight on the resources available to 4-H extension educators to provide accommodations, adapt youth development programs, and implement inclusive practices.

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Introduction/Need for Research

Approximately 19% of youth in the nation have special health care needs and about 23% of youth experience one or more mental, emotional, developmental, or behavioral need (Data Resource Center for Child & Adolescent Health, 2020). In 2020, only 45% of children with special health care needs indicated they did participate in clubs or organizations after school or on weekends, whereas only 40% of youth with emotional, behavior, or developmental problems stated they did participate in clubs or organizations after school or on weekends (Data Resource Center for Child & Adolescent Health, 2020). Being involved in clubs or after-school organizations can “offer opportunities for kids to learn new skills, explore different areas of talent, deepen existing expertise, get support for areas they aren’t as strong in, make friends, and form relationships with supportive adults” (Deutsch, 2016, para. 1). Research also indicated participating in after-school organizations “can have benefits for kids, including social skills, emotional development, and academics” (Deutsch, 2016, para. 3). The need for disability inclusion within youth organizations is crucial to provide youth the opportunity to be involved; therefore, youth development professionals need to know how to properly accommodate individuals with disabilities to present equal opportunities to participate.

“Disability inclusion is to include people with disabilities in our everyday life and society. It is to provide accessibility to people with disabilities in areas of employment, communications,

business, housing, products, and services. It is to provide them with the same opportunity that everyone else in the society gets in every aspect of life” (Man, 2020, para. 1). Inclusive youth programming allows for members to learn amongst others who are diverse from them and fulfill the social responsibility of providing equal access and opportunities for all. The principle of disability inclusion is to create a program or environment that is welcoming to all, regardless of ability. Being able to showcase diversity inclusion, which includes multiple differences one of which is disability, amongst an organization’s members is the first step towards equity inclusion, which is “discovering, creating and providing what is required, requested and measured by each human to feel equal” (Walker, 2021, para. 6). Diversity in youth programs builds cultural awareness and creates a sense of belonging when others are mindful and accepting of differences. By acknowledging diversity, we emphasize our differences are what make us unique, and this recognition creates stronger relationships among members (Walker, 2021).

The national 4-H organization is America’s largest youth outreach program provided through land-grant institutions’ cooperative extension services (National Institute of Food and Agriculture, n.d.). 4-H practices positive youth development through leadership opportunities and the building of life skills. The 4-H program is based around developing young people by giving them a voice to express who they are and how they make their lives and communities better (4-H, 2021). For youth to feel confident in expressing their originality, youth development professionals must be knowledgeable about diversity inclusive programs and practices as “helping youth cultivate genuine curiosity and empathy towards people from different backgrounds may contribute to their learning orientation” (Sumner et. al., 2018, pg. 75). Preparing 4-H extension educators on how to interact with youth with disabilities effectively and efficiently is essential to create an organization that is accessible and provides equal opportunities to all. Diversity and inclusion are relevant to all youth programs, not just 4-H, as interacting with diverse individuals is a key to success in the modern world (Sumner et. al., 2018).

Universal design is vital for youth programs to effectively engage students of all ability levels as “universal design is an approach that levels the access to learning for our students and helps them remove boundaries and barriers that might be in place” (Headrick, 2021, p. 13). While the implementation of universal design provides physical inclusion, individuals with disabilities may still face social exclusion due to peers being intimidated or unknowledgeable about disability awareness and diversity. Inclusion today “involves social interaction as well as physical integration” (Stumpf et. al., 2002, pg. 2). Program diversity and inclusion is heavily influenced by the program leaders or advisors support, as “providing support expresses an acceptance of a person and their abilities and enables the individual to participate at his or her level of independence” (Stumpf-Downing et. al., 2004, pg. 2). Integrating youth with disabilities into mainstream youth programs “improves social acceptance, self-esteem, and social skills for all youth involved” (Brady & McKee, 2005, pg. 1). “All youth can benefit from the opportunity to become more aware of differences and more tolerant and accepting of others” (Brady & McKee, 2005, pg. 1). Disability awareness and understanding can be enhanced by instilling diversity inclusion in youth programs which “will enhance the program’s ability to facilitate the development of these skills and attitudes among participating youth” (Sumner et. al., 2018, pg. 70).

Ensuring that the 4-H program is accessible to all, 4-H Extension Educators must be aware of disabilities within the communities they serve. However, a literature review conducted in 2019 concluded there is a need for more research regarding programs serving individuals with disabilities, specifically youth in 4-H (Taylor-Winney et. al., 2019). “People with disabilities are an area of limited study in Extension research” (Stumpf-Downing et. al., 2004, p. 2) and a variety of studies have shown fluctuating levels of disability inclusion resources for Extension professionals from different states. In a study done by Peterson et. al. (2012), Extension professionals indicated the barriers they faced to inclusive programming were lack of knowledge related to disability and lack of resources. Another study in North Carolina based on creating inclusive 4-H environments, stated “inclusion should become an integral part of all future staff and volunteer training” (Stumpf-Downing et. al., 2004, p. 4), and “A focus on disability awareness is critical as a first step. If people with disabilities are to be a part of community programs, such as 4-H, an ongoing focus must be on how to ensure individuals with disabilities are offered inclusive opportunities. The progression of information must move beyond awareness to "marketing, recruitment, and retention” (Stumpf-Downing et. al, 2004, p. 5). To address the needs of diverse individuals in their communities, it is vital for 4-H Extension Educators to receive disability awareness and inclusion training. Inclusion training should become an integral part of Extension to create diversity awareness amongst communities and provide perspectives that are knowledgeable and accepting of others.

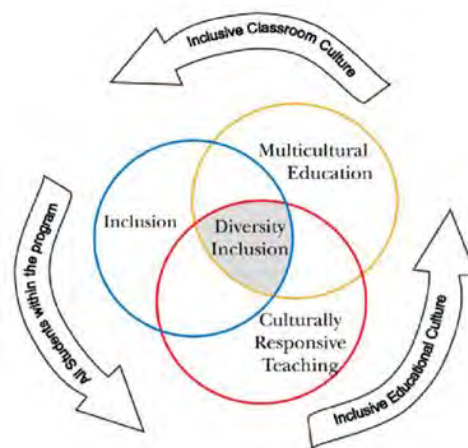
“Access, equity, diversity, and inclusion are essential elements of 4-H’s goals related to positive youth development and organizational sustainability” (National 4-H Organization, n.d., para. 2). If 4-H Extension Educators can create an organization that showcases the elements of access, equity, diversity, and inclusion; 4-H can attract youth that feel excluded and create an experience that is supportive and inclusive of diverse youth (Sumner et. al. 2018). To create an environment where youth feel confident in expressing their originality, youth development professionals need to understand differences and exceptionalities to effectively interact with youth of all levels of ability. “As a system, Cooperative Extension believes that diverse perspectives, values, and beliefs help generate better ideas to solve the complex problems of a changing and increasingly diverse-world” (National 4-H Organization, n.d., para. 2). With the proper training, 4-H Extension Educators can provide youth with disabilities the chance to fully participate in 4-H to gain motor skills, social adeptness, and self-confidence while increasing diversity within the program to prepare youth without disabilities for a world of differences (Guay, 2020).

"For youth development professionals to be successful in our multicultural society, they must have a deep understanding of the impact of limited access and opportunities and inequities on the lives of many cultural groups living in the U.S. today" (National 4-H Learning Priorities Equity, Access, and Opportunity, 2008, pg. 1). It is critical that 4-H Extension Educators understand disability inclusion and have awareness to accommodate specific individuals to reflect an organization that is equitable and provides equal opportunities to all members. By showcasing diversity inclusion at the county, state, and national level; 4-H creates future leaders that are aware of societal changes that must be made to meet the needs of all participants. By providing 4-H Extension Educators with the proper resources to accommodate individuals with disabilities we can broaden diversity awareness and empathy to enhance an enriched youth development program that is accessible to all.

Conceptual Framework

The conceptual framework for this study was based upon LaVergne's Diversity Inclusion Program Model. According to LaVergne, diversity inclusion is an educational philosophy that welcomes all learners regardless of race, ethnicity, or exceptionality to actively engage them in educational programs (LaVergne, 2008). For diversity inclusion to be obtained in an educational setting, educators must address inclusion, multicultural education, and culturally responsive teaching. LaVergne's Diversity Inclusion Program Model encompasses the three themes of diversity inclusion and displays how to formulate inclusive educational culture within an educational environment that includes all students in all programs. When the criteria for diversity inclusion is met, educators understand the positive benefits of diversity inclusion, the pre-existing barriers that underrepresented students face, and have an awareness of increasing diversity awareness among others. While this framework is formed around classroom culture, it is applicable to non-formal educational programs as well. Youth development professionals who recognize and are receptive to diversity inclusion also build personal relationships with youth to gain an understanding that relates to the personal needs of the individual (LaVergne, 2008). A study conducted on West Virginia 4-H Youth Professional's perceptions of diversity inclusion in 4-H, LaVergne's Diversity Inclusion Program Model was used to postulate that diverse program success is based on how well prepared the workforce is in working with diverse youth (LaVergne, 2013). To allow for diversity inclusion in the 4-H organization, youth development professionals must be properly prepared and have access to resources to implement an inclusive educational environment.

Figure 1. LaVergne's Diversity Inclusion Program Model (2008)



Purpose and Research Objectives

The purpose of this study was to analyze Kansas 4-H Extension Educator's perceived knowledge and abilities towards disability awareness and inclusion in the 4-H program and the resources available to them. The guiding objectives were:

1. Examine disability awareness training amongst Kansas 4-H Extension Educators,
2. Examine knowledge and perceptions of Kansas 4-H Extension Educators regarding disability within their 4-H program, and

3. Identify levels of engagement with disability and comfort levels regarding disability in Kansas 4-H Extension Educators

Methodology

A census of all Kansas 4-H Extension professionals was attempted, and participants had to meet the criteria of being employed by Kansas Research and Extension (KSRE) and serve in a position of 4-H Extension Agent/Assistant/Manager/Coordinator for their county or district (Fraenkel et. al, 2019). The population for this study was 90 individuals who met the criteria. Participants were contacted by email. Addresses were obtained through county and district extension websites. There were 74 county 4-H Extension Educators and 16 county 4-H Program Assistants/Managers/Coordinators. Forty of the 90 participants completed the survey (44% response rate).

A twenty-question Qualtrics® survey was distributed to participants regarding their knowledge and experience with disability in the 4-H program. The questions consisted of short answer, essay, multiple choice with the ability to add additional comments, and Likert-Type Scale. The survey was displayed in four sections which included demographics, disability interaction, disability awareness, and disability perception. Survey questions were derived from LaVergne's Diversity Inclusion 2008 and 2013 studies (LaVergne, 2008; 2013).

The demographics section included sex, age, years in 4-H Extension, if they received disability awareness training in their academic or professional career and asked them to describe the type of disability awareness training they received if applicable. The disability interaction section presented questions on awareness of disability within their 4-H program, how often they interacted with disability during their career, to indicate which types of disabilities they had interacted with from a list provided, and to describe the specific types of disabilities they had interacted with. The section on disability awareness was formatted as a Likert-type scale where participants ranked their answers as below average, average, or above average. A three-point scale was used to avoid what could be minimal differences in perceived knowledge between participants. Participants rated their knowledge of disability in 4-H, ability to recognize disability within their 4-H program, ability to provide reasonable accommodations for a 4-H member with a disability, the resources available to them to provide accommodations, and the current accessibility of their 4-H program for youth with disabilities. The disability perception section was also formatted as a Likert-type scale that had participants rank their comfort levels from extremely uncomfortable, somewhat uncomfortable, neither comfortable nor uncomfortable, somewhat comfortable, and extremely comfortable. Questions included participants indicating how comfortable they are with interaction with a 4-H member with a disability, how comfortable they are adapting universal design into their 4-H program, and how comfortable they are training others on disability awareness and accommodations.

The definitions of universal design, disability awareness, physical disability, and mental disability were provided on the instrument. Universal Design was defined as the design of homes, products, and systems that work for people of all ages and abilities. Disability awareness was defined as being mindful of the disabilities of people and managing to communicate and work with them efficiently. Physical and mental disability were defined by the ADA as a physiological disorder or condition, anatomical loss, or cosmetic disfigurement and any

physiological or mental disorder, such as emotional or mental illness, mental retardation, organic brain syndrome, and learning disabilities.

IRB approval was obtained before this data was collected from this study. A pilot test was conducted with 4-H Extension Educators in a neighboring state to estimate reliability. The same survey was presented, and fourteen responses were recorded. Cronbach’s alphas were estimated on the Disability Awareness Ranking and Disability Perception sections of the survey which were open to reliability, the estimates were .75 for Disability Awareness Ranking and .81 for Disability Perception. The instrument was deemed reliable. Early to late respondents were compared and no significant differences were found, therefore non-response error is not an issue and the accepting sample represents the population.

Findings

The majority of respondents were female (85%) with the largest age range being 41-45 (25%) years of age (see Table 1). Most respondents had been employed by KSRE for 0 (<12 Months)-5 Years (47.5%). Cross-sectional data analysis was used to evaluate and interpret the 40 4-H Extension Educator responses to the survey (Setia, 2016).

Table 1
Characteristics of Participants (n=40)

Characteristic	<i>f</i>	%
Sex		
Male	6	15.0
Female	34	85.0
Age		
20-25 Years of Age	5	12.5
26-30 Years of Age	9	22.5
31-35 Years of Age	4	10.0
36-40 Years of Age	3	7.5
41-45 Years of Age	10	25.0
46-50 Years of Age	2	5.0
51+ Years of Age	7	17.5
Years in 4-H Extension		
0 (<12 Months)-5 Years	19	47.5
6-10 Years	5	12.5
11-15 Years	4	10.0
16-20 Years	5	12.5
21-25 Years	3	7.5
26+ Years	4	10.0

Objective 1: Examine disability awareness training amongst 4-H Extension Educators.

Participants were asked to indicate the amount of training regarding disability they had received at the High School/Collegiate level and at the Career level (see Table 2). At the High School/Collegiate level, 62.5% had received no training, while 37.5% had received some sort of training in their academic career. Participants stated that if they had received training in their academic career, it had been a segment in a course that covered a different, broader topic. One

participant stated, “Disability Awareness training I took from college level classes were small subsets of a larger course. About a week was devoted for one class in college.”

Participant responses indicated 20% of participants had received no disability awareness training during their career and 80% had received training while being employed by KSRE. The trainings included sessions at professional development events, state level contact regarding providing accommodations when it was requested, informational handouts, and training through previous careers before the individuals were an employee with Extension Services. Two participants shared, “We barely skimmed the surface in some required online courses through Kansas State University when I started my position as an agent” and “Honestly it wasn’t a specific class or training it was more informational handouts and talks as the subject came up.”

Table 2
Disability Training Amongst Kansas 4-H Extension Educators (n=40)

Training	Yes		No	
	<i>f</i>	%	<i>f</i>	%
High School/Collegiate	15	37.5	25	62.5
Career/Work Level	32	80.0	8	20.0

Objective 2: Examine knowledge and perceptions of 4-H Extensions Educators regarding disability within their 4-H program

Respondents were presented a Likert scale when asked to rank their knowledge of disability within 4-H and their personal program (see Table 3). Many participants indicated that their collective knowledge of disability within 4-H was only average (65.7%) and only eight participants (21%) felt their ability to provide reasonable accommodations for individuals with disabilities was above average. Only 5 respondents (13%) felt their ability to recognize disability within their 4-H program was above average with seventeen participants (44.7%) indicated the resources available to them to provide accommodations were below average. Respondents were asked to indicate the current accessibility within their own 4-H program and ten (26.3%) indicated accessibility was below average, 27 (71%) indicated accessibility was average, and one (2%) indicated accessibility was above average.

Table 3
Perceived Knowledge and Perception of Disability in 4-H Extension Educators (n=38)

Question	Below Average		Average		Above Average	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Knowledge of Disability in 4-H	11	28.9	25	65.7	2	5.3
Ability to Provide Accommodations	9	23.6	21	55.2	8	21.1
Ability to Recognize Disability	8	21.0	25	65.7	5	13.2
Resources Available to Provide Accommodations	17	44.7	19	50.0	2	5.3

Current Accessibility Within Their 4-H Program	10	26.3	27	71.0	1	2.6
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Objective 3: Identify level of engagement with disability and comfort levels regarding disability in 4-H Extension Educators.

Of the 40 respondents, 81.58% indicated youth with disabilities participated in their 4-H program (see Table 4). One individual indicated they had never interacted with an individual with a disability during their career as a 4-H Extension Educator.

Table 4
Kansas 4-H Extension Educators Level of Engagement with Individuals with Disabilities within Their Career (n=38)

Level of Engagement	<i>f</i>	%
Never	1	2.6
Sometimes	21	55.2
About half the time	10	26.3
Most of the time	4	10.5
Always	2	5.2

Respondents were asked to indicate which types of disabilities they had interacted with during their employment with KSRE (see Table 5). They were able to mark multiple disability options which totaled to 131 responses. Specific Learning Disabilities; Orthopedic, Speech and Hearing Impairments; and Down Syndrome or Autism were indicated as the most common disabilities Kansas 4-H Extension Educators encounter. Respondents were also given the chance to indicate any disabilities encountered that were not listed. ADHD and learning disabilities were common answers and one individual responded, “It is everywhere!”

Table 5
Types of Disabilities Kansas 4-H Extension Educators Interact With (n=38)

Disability	<i>f</i>	%
Specific Learning Disabilities	28	21.3
Orthopedic, Speech, and Hearing Impairments	27	20.6
Down Syndrome or Autism (Intellectual Disability)	21	16.0
Visual Impairments	15	11.4
Diabetes	15	11.4
Cerebral Palsy	8	6.1

Epilepsy	6	4.5
Muscular Dystrophy	5	3.8
Heart Disease	4	3.0
Drug Addiction	1	0.7
HIV Infection	0	0.0
None	1	0.7

When asked what their comfort level was when interacting with individuals with disabilities, many indicated they were Somewhat Comfortable (see Table 6). Only eight participants (21%) responded that they were Extremely Comfortable with adapting universal design into their 4-H program to make it more accessible and only one respondent (2.6%) indicated that they were Extremely Comfortable to train others on disability awareness and accommodations.

Table 6
Comfort Levels of Kansas 4-H Extension Educators Regarding Disability within 4-H (n=38)

Variable	f	%	f	%	f	%	f	%	f	%
	EU		SU		N		SC		EC	
Interacting with Disability	0	0.0	3	7.8	4	10.5	18	47.3	13	34.2
Adapting Universal Design into Program	1	2.6	4	10.5	6	15.7	19	50.0	8	21.0
Training Others on Disability Awareness and Accommodations	6	15.7	11	28.9	11	28.9	9	23.6	1	2.6

Note. EU=Extremely Uncomfortable, SU=Somewhat Uncomfortable, N=Neither Comfortable or Uncomfortable, SC=Somewhat Comfortable, EC=Extremely Comfortable

Conclusion/Implications/Recommendations

Overall, 4-H Extension Educators received disability awareness training at the Career/Work Level rather than during their academic career, but trainings were in collaboration with broader topics. In relation to the previous study using LaVergne’s Diversity Inclusion Program Model in 2013, this study’s findings demonstrate the lack of preparation of 4-H Extension Professionals during their academic career to achieve diversity inclusion in their 4-H programs. Many participants indicated that their collective knowledge of disability within 4-H was only average, and few participants indicated that they felt able to provide reasonable accommodations for individuals with disabilities within their program. LaVergne’s Diversity Inclusion Program Model (LaVergne, 2008) demonstrates that for diversity inclusion to be obtained, educators must understand the positive benefits of diversity inclusion, pre-existing barriers that underrepresented students face, and have an awareness of increasing diversity awareness among others.

Many 4-H Extension Educators had interacted with individuals with a variety of disabilities and shared mixed quantities of comfort levels regarding adapting universal design into their program and training others on disability awareness. To obtain the three themes of diversity inclusion displayed in LaVergne's Diversity Inclusion Program Model (LaVergne, 2008), proper preparation of 4-H youth professionals must be ensured. Extension professionals obtain a variety of degrees in their academic careers; therefore, Extension services cannot depend on universities to provide diversity inclusion training within a student's collegiate curriculum before they enter the workforce. Diversity awareness training and resources must be provided through Extension services and be a required training for Kansas 4-H Extension professionals to be able to formulate an inclusive educational culture for youth of all levels of ability. Extension services should put forward online resource guides that instruct Extension professionals on providing reasonable accommodations, creating accessible programs, and various inclusive practices to promote diversity inclusion to youth within their 4-H program. Professional development is also needed to identify potential inaccessibility within their 4-H program and methods to create a more inclusive youth development program. Extension professionals must understand how to make experiences-based programs, such as livestock shows, more accessible for individuals with disabilities to be integrated into the mainstream program.

Future research should investigate current disability trainings offered through Kansas 4-H Extension and the current resources available for Kansas 4-H Extension Educators to provide reasonable accommodations for individuals with disabilities. The lived experiences of 4-H Extension Educators who have previously provided accommodations should be examined to formulate a structured process of requesting an accommodation, attaining the resources needed, and notifying volunteers and staff involved in the organization if necessary. Lived experiences can also serve as examples for trainings and connect Extension Educators to colleagues with prior experience with disability in their 4-H program. Preparation of youth development professionals during their academic career should also be examined to evaluate college curriculum regarding disability awareness and inclusion in educational environments outside of the classroom. A future study should be conducted with 4-H Extension professionals in other states to cross examined and compare differences in disability awareness and diversity inclusion training as this study's findings are limited to Kansas 4-H Educators. Although disabilities from LaVergne were used in this study, future studies should separate Down syndrome and Autism into individual items.

For the National 4-H Organization we recommend required diversity and inclusion training to be implemented in all states for 4-H youth development professionals to gain foundational knowledge on disability within the program. We recommend the development of an accessibility manual that provides guidelines on legal regulations mandated for public facilities and how to make experience-based programs more accessible. We recommend an expansion of this study to further understand the perceptions of disability by the 4-H Extension Educator population as the limitations of this study include not surveying every potential KSRE 4-H development professional and a limited response rate due to non-response.

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Perceived Barriers and Resources Needed to Effectively Implement SAE for All

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Abstract

SAE for All was launched by the National Council for Ag Education in 2015 and North Carolina launched the model through statewide professional development in 2019. This 2022 qualitative study sought to understand the barriers teachers were facing in implementing the SAE for All model. The study also sought to understand the resources that were needed for teachers to be able to fully implement SAE for All in their classes. There were barriers related to the teachers and the students and a list of needed resources including both professional development as well as modifications to the SAE for model documents, guides, and resources. Recommendations are given for stakeholders as they work to support wider integration of SAE for All.

Introduction

Supervised Agricultural Experience (SAE) is recognized as an integral component of the three-circle model of School Based Agricultural Education (SBAE) along with classroom instruction and FFA (Croom, 2008). This work-based learning project is credited to Stimson's (1919) home project which extended classroom learning to projects completed on the students' family farms. For years, SBAE teachers have indicated they believe SAE is a valuable experience for their students, but implementation in programs has not aligned with those stated beliefs (Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007). When considering the amount of time spent on SAE, teachers have shared that they believe they are not spending enough time in this area (Shoulders & Toland, 2017; Wilson, 2022). Teachers have indicated many barriers to implementing SAE in their programs but few ways to improve their implementation of SAE.

Finding the time to fully implement SAE is known to be a challenge for SBAE teachers (The National Council for Agricultural Education, n.d.). With varied teacher contracts, increased student enrollment, teaching responsibilities, FFA advising, and other after school responsibilities, SBAE teachers have limited time to closely supervise SAEs (Moore et al., 1997; Steele, 1997; Wilson, 2022). Connecting with each student on an individual basis about their SAE is necessary for student success (Bryant et al., 2022), but demands time that many teachers believe they do not have.

The diversification in student enrollment and lack of prior experiences in agriculture have created additional barriers for SAE (Retallick, 2010; The National Council for Agricultural Education, n.d.). Not only do teachers have to ensure that students, guardians, and administrators understand the purpose of SAE (The National Council for Agricultural Education, n.d.), but they also have to make connections and resources available to their students for implementation (Retallick, 2010; Wilson, 2022). The image of SAE varies significantly between programs and lack of understanding of SAE and connections within a community can be an additional challenge for the teacher (Retallick, 2010; Wilson, 2022).

SAE's connection to the other two components of the three-circle model impacts the implementation as well. It has been seen that SAE is often driven by the award structure in FFA (Retallick, 2010). Current SAE-based award applications are primarily based on student records with a heavy focus on placement and entrepreneurship projects (National FFA Organization, n.d.). Record keeping for award applications in North Carolina is expected to be done in the Agricultural Experience Tracker (the AET) (Joshua Bledsoe, State Director, personal communication, October 2022). Due to the perceived complexities of the program, teachers have indicated they need professional development on using the AET and on keeping SAE records (Aviles, 2017; Sorenson et al., 2014).

Implementation of SAE among programs varies significantly. The value placed on SAE in a program and its impacts on students depends strongly on the teacher (Lewis et al., 2012; Marzolino & McKim, 2022; Retallick, 2010; Shoulders & Toland, 2017). Bryant et al. (2022) as well as Marzolino and McKim (2022) found that teachers that require SAE as a grade believe that the experience leads to increased student growth. This is a stark contrast to the significant percentage of programs that are not requiring SAEs (Lewis et al., 2012).

These concerns motivated the current SAE model, SAE for All, which was adopted by the National Council for Agricultural Education (The Council) in 2015 (The National Council for Agricultural Education, 2015). The purpose of SAE for All is to be "a student-led, instructor supervised, work-based learning experience that results in measurable outcomes within a predefined, agreed upon set of Agriculture, Food and Natural Resources (AFNR) Technical Standards and Career Ready Practices aligned to a career plan of study" (The National Council for Agricultural Education, 2017, p. 2). SAE for All was established with the many barriers SBAE teachers have indicated in mind and to ensure that SAE could be accessible for all students (The National Council for Agricultural Education, n.d.).

In North Carolina, curriculum was updated in 2018 with SAE for All terminology and the program was officially introduced to all teachers at the CTE Summer Conference the following year (Joshua Bledsoe, State Director, personal communication, October 2022). With the completion of multiple school years since the expected implementation of SAE in North Carolina, there is a need to understand what barriers are keeping SBAE teachers from fully implementing SAE for All in their programs and what resources they believe are needed for success.

Theoretical Framework

This study was guided by Ajzen's (1991) Theory of Planned Behavior. The theory explains human behavioral intention, and ultimately action, through the use of attitudes, subjective norms, and perceived behavioral control. For the purposes of this study, we operationalized *attitude* to be teacher attitude toward both SAE and the SAE for All model. Subjective norm would be how the teacher perceives others see their program. Those others may include students, teachers, state staff, administrators, community members, and more. Lastly, the areas in perceived behavioral control are especially significant in the present study since this construct would include perceived barriers as well as perceived enablers. This is also where a

teacher might identify resources that would be needed to move from behavioral intention to behavioral implementation.

Purpose(s)/Objective(s)

This study sought to understand the barriers that were keeping teachers in North Carolina from fully implementing SAE for All and to better understand the resources they need. The research questions guiding this study were:

1. What are North Carolina SBAE teachers' perceived barriers to implementing SAE for All?
2. What resources do North Carolina SBAE teachers need to be able to implement SAE for All?

Methods/Procedures

Qualitative research is utilized when there is very little known about the subject being studied (Creswell & Creswell, 2018). Specifically, a phenomenological study, “describes the lived experiences of individuals about a phenomenon as described by participants” (Creswell & Creswell, 2018, p. 13). This phenomenological qualitative study aims to gain a better understanding of what barriers are preventing the implementation of SAE for All and what resources would better support the teachers' efforts. SAE for All was rolled out in the state in 2019 and many teachers have taught with it, some for multiple semesters. These findings address one portion of a broader study into SAE for All implementation.

Data Collection

Participants were selected through purposive sampling to gather a representative sample of the state teacher population (Merriam, 2009). The state teacher population at the time of the study was approximately 570 teachers. Criteria considered when working with state Agricultural Education staff in identifying potential participants included representation of all regions in North Carolina, teacher education pathways, years of experience, program size, and program community. Participants were contacted via work email between April-June 2022 and study inclusion criteria consisted of: (1) Current North Carolina School Based Agricultural Education (SBAE) teacher, (2) At least one full year of experience as a SBAE teacher, and (3) Include Supervised Agricultural Experience (SAE) as a component of your SBAE program. Participants indicated through a Qualtrics consent form their willingness to participate in the study and scheduled an interview time through email. Individual interviews were conducted with thirteen participants (see Table 1) between April-June 2022 yielding more than five and half hours of interview data which were transcribed from recordings by the researchers. The semi-structured interview protocol consisted of eight questions that related back to the two research questions.

Table 1
Participants

<u>Pseudonym</u>	<u>School level</u>	<u>Teachers/ Program</u>	<u>Community</u>	<u>Years Teaching</u>
Tammy	Middle	1	Urban	2
Patsy	High	1	Suburban	3

Reba	High	1	Rural	4
Naomi	High	2	Rural	5
Loretta	Middle	1	Suburban	5
Kenny	High	2	Rural	5
Dolly	High	3	Rural	8
Rosanne	High	1	Rural/Suburban	10
Randy	High	2	Rural	11
Emmylou	High	3	Urban	14
Willie	High	4	Rural	18
Keith	High	3	Rural	24
George	High	2	Rural/Suburban	25

Data Analysis

Several methods of data analysis were used to provide an accurate representation of how SAE for All is being implemented in North Carolina. During interviews, researchers made memos to record their reactions, thoughts, and emerging themes. Data from the transcribed interviews were coded by both researchers to identify major themes. Researchers then compared their themes to confirm findings. Trustworthiness was established through rich, thick descriptions. Direct quotes throughout the findings are used to provide the clearest overview of the phenomenon of implementing SAE for All in SBAE classrooms in North Carolina. Reliability was established through continuous review of coding and clear communication between both coders working with the collected data. The limitations of this study are (1) the study only includes teachers from North Carolina and (2) findings may not be generalizable beyond the sample.

Reflexivity

Researchers worked to control their bias throughout the process by bracketing their experiences, writing memos during the study, and talking about findings during each stage of the study. Both researchers are involved in the agricultural education profession. Both taught SBAE in North Carolina and required their students to have SAE projects. One researcher utilized SAE for All in her program. Both researchers work together to teach the experiential learning course for agricultural education students at North Carolina State University where students are learning about SAE and SAE for All. These experiences have positively shaped both researchers' opinions of SAE and SAE for All and will allow them to be aware of possible successes and challenges in implementing SAE for All, but also may impact their interpretation of themes and findings.

Results/Findings

The data led to the construction of themes around student-related barriers, teacher-related barriers, and the perceived resources needed to fully implement SAE for All.

Theme 1: Student-related barriers.

The first student-related barrier identified by teachers was *student motivation*. Whether a fair assessment or not, it was teacher perception that many students were not on board with SAE for All. George stated “we don't quite have the buy-in with kids yet that we probably need to really make it work.” He added “I think they kind of feel like a lot of the foundational stuff is just another assignment.” Rosanne indicated that conducting SAE for all through COVID was especially challenging. She stated

I felt like more of a ‘you do have to do this whole entire guide’ and it was just a lot for the kids. It was a lot for them to navigate through COVID. How can I say this tactfully? Um, it made it to where kids didn't want to work as much. I'll just say that - they became lazy. They don't want to put in the time and effort to research stuff and so, it's not a hard guide, but when they looked at it and they saw what they needed to do... it was overwhelming. And then they had to answer questions and that just made it, I don't know, they just didn't want to do it.

Kenny had a similar experience. He also chose to talk about the career exploration activity where students complete career interest inventories. He added “it takes them three or four class periods, hour and a half each, to get through one of those” adding that there was “a wide spectrum of kids, those that get it done in one day and then the majority of kids take that long, longest time.”

Some teachers indicated students were more bought in before COVID. Referring to the percentage of her students that have an SAE, Naomi indicated, “it's kind of half and half right now with the whole COVID deal” but went on to explain that “Before [COVID] I would probably have four or five that did not, but they were the ones that would not do a lot of the classwork stuff.”

Reba thought that SAE for All was a tool for overcoming some of the issues with student motivation. She stated

It's a little bit challenging and even now, as we see different generations of students. They don't work on the farm anymore. They don't want to start a project. They don't want to try something new. So, it's a little bit challenging, generationally, to get students to really invest into an SAE project, so I think the SAE for All kind of gives you more options to help students implement that into their life.

Another student-related barrier was *transportation*. Within our study, we definitely had those who talked about students who have not yet reached the age where they can drive. In thinking specifically about the immersion projects, Dolly indicated “younger students that can't drive, it's been a little bit more of a challenge”, but added that might be related to the rural nature of her school district and the fact that she is in one of the largest geographic counties in the state. We expected to hear this as it relates to transportation and while not new, it can present a challenge. What we were not expecting is the number of students who are old enough to drive but do not drive. Kenny indicated that his students “may turn 16, but they probably don't have their license yet, because the driver's ed issues or their family can't afford it.” Kenny teaches in a rural setting, but we heard the same thing from Patsy who lives in a suburban area. Patsy stated

Our students just don't drive. Maybe that's just where I live, but I mean, I can't tell you how many seniors don't have their license so they don't have the transportation to get

anywhere. Or they have to rely on a parent who also has a job or something. So students just can't get to these places so then that proposes a question like 'how do they do SAE? How do they get agricultural experience when they can't move?'

The next student related barrier was *communication*. As teachers talked about implementing the SAE for All model, multiple teachers brought up a students' reluctance to talk. This was discussed in regards to reaching out to community members, making a phone call or even asking a teacher for help. Patsy was the first to outline this challenge. She talked about it in two settings.

Since we're in such a technological age, students do not want to get up and go talk to a stranger. So, if I say like 'hey you need to go get your 10 hours in anything agriculture, whatever you want,' for me as a teenager, like, 'Yes. Awesome. I can pick what I want to do this project on, right?.' For them, like 'Oh gosh. That means I have to go figure out who I need to talk to set this up? And I need to set this up myself.' You know? And I was very quick to be like 'Oh that's just this generation', or whatever, but that's just kind of how they've been raised...so I feel like we need to figure out a way not to make it easier on them... because it's not like our students don't want to do it. They just are facing different barriers than we've had before.

Patsy added that while not true of all students, for many "they're not really ready to go up and say 'hey, how do you do this? I need help figuring this out.' They just won't do it, and they will take that zero or whatever because they don't understand it." Naomi took a different approach when discussing helping students make connections in the community, sharing

For the most part they've been kind of the main people that set up their stuff. I can point them in directions and if they need a little extra guidance, I do help out here and there. But for the most part, I let them do all the talking that way they get that little experience there because again when they go to get a real job they're going to have to be able to talk to people, so I kind of am hands off for the most part, but if they need me I'm there.

Theme 2: Teacher-related barriers

The first teacher related barrier was *SAE Philosophy*. Rosanne indicated that she was at a place, career wise, where she was frustrated with SAE. She indicated "the way that SAE was kind of designed, I just was really frustrated and needed something fresh to be done. My kids were frustrated with it" and that is when she was introduced to SAE for All. She also indicated that it required a philosophical adjustment stating "it's been a whole different kind of paradigm shift that I was willing and excited for."

The most common hang-up for change has been the belief that SAE for All is not "ag enough" for some. Willie indicated it "100% bothers" him that SAE for All allows for non-agricultural SAE projects while Dolly, speaking for herself and her teaching partners stated "we 100% believe in SAEs and while we do like SAE for All, I will say we lean more toward the immersion side because, I mean, we are agriculture educators." George expanded on this belief further "philosophically it's a little bit of a struggle for me because the way I was taught SAE a long time ago. SAE for All we focus on the whole foundational piece and foundational can be

just about anything.” This idea of a foundational SAE as a ‘hurdle’ to get students past was not unique to George and others stated the same idea in different ways.

The next teacher-related barrier was *change is hard*. Keith put that response out right away. He stated “I think the biggest barrier is more of us. I guess us adopting that mindset, not that we’ve been against SAE for All, but just you know change, transitioning to make this a bigger part of our program intentionally”. When reflecting on why his program had not attempted to transition to the SAE for All model, Willie was quick to share, “Honestly, nothing is stopping us. It's just literally the word ‘change’... It's just going through change, but other than that, nothing. I'm completely receptive to it, just haven't had to.” Reba stated

I mean, Ag Ed is a very rooted in tradition and how things have always been, and how they're always going to be so, I think it's just going to take time to educate and you know, the new guard of teachers and, more importantly, educate the old guard of teachers, who have done it a certain way for 20 years.

Rosanne said “I think doing a better job of getting people to realize like SAE doesn't have to be what it used to be, you know? It can, but it doesn't have to be.”

The third teacher-related barrier was *alignment to FFA degrees and proficiency awards*. Several participants referenced proficiency awards as the major outcome for SAEs in their classes. Naomi shared that she struggled to get her students to buy-in to her record keeping expectations that align with award applications, saying, “it's just a matter of trying to get them to go on AET and keep up with their hours.” Dolly and her teaching partners utilize the proficiency award application as a baseline for all of their students, sharing “I think that proficiency [awards are] really great to how they are and they really set a standard” and she added that “I wouldn't change it to fit everybody's needs at all.”

Emmylou expressed her dislike of the unclear rules for FFA degrees above the chapter level. She shared that her students earn foundational hours during the school day and her program accepts those for chapter degrees, but when sending applications beyond the local school those activities may not count as hours towards degree completion adding “our kids get frustrated with because it's like, ‘But this counted in class and this counted at [my school] and it might have counted as a state degree. Why can't I get my American degree?’”

The fourth teacher-related barrier was *knowledge of the SAE for All model*. When discussing what was holding him back from shifting to the SAE for All model, Randy quickly identified “my understanding is what’s the main barrier.” He went on to explain “when I’m looking at the guides it's hard for me to track, so when it's hard it's hard for me to track, it's hard for us to track it.” Others were less clear with the terminology and how it impacted their students. In Dolly’s program, she referred to a student having a job at a local grocery store as a foundational project, sharing that the student would still “have to at least do 25% in the immersion project...so they can't do all 20 hours in their SAE at Food Lion.”

Another barrier teachers highlighted was *time*. Randy talked about needing time for SAE for All to be implemented. He said, “leave something in place long enough for us to learn it and get it done”. Randy pointed out that within the course blueprints in North Carolina, two weeks of course time are given to SAE. However, he went on to say that “I can't cover SAE in a two-week

period” and compared the adjustments he makes in his curriculum to “robbing Peter to pay Paul”. He indicated SAE “is probably the most important thing that we do within ag ed,” but that there wasn’t enough time to do it well. Loretta, however, talked about time, overall as it relates to the job. She “didn’t have enough time in the day” to do the job of an ag teacher and she doesn’t “have enough time to help every individual kid all the time with their projects.”

Reba summed up what many of us have known about SAE for years.

I think that SAE if, you know, think about the three-circle model of ag education you know you've got the ag in the classroom, which is what technically what we're paid to do what we, you know, what we go to school to learn how to teach and so that's a strong component. If you think of it like the three legs on a stool like that's a strong one. And then FFA, most teachers go into teaching [agriculture] because they've discovered it through FFA and they love FFA and they want to do all those things. And then, SAE is kinda like the redheaded stepchild of that little three circle model and some teachers don't know how to implement it and I think the SAE for All gives, it's more inclusive to all types of students, because we don't have a traditional ag student anymore like we would have you know, a farming student, and so it gives them a better chance to implement that in a way that works for their program which I think is great. Because I think SAE is always the area, no matter what we do, it's always going to be the area that needs the most help.

Theme Three: Perceived Resources.

The first perceived resource was *formatting improvements*. Participants overwhelmingly indicated that they needed the formatting of the foundational student guides to be improved. We heard from several participants that even though the student guides are available from The Council and as Microsoft Word documents, they are not ready for their learning management systems (LMS). Dolly shared how she struggled to use the documents with her students since she is expected to have “everything done through Canvas within my school system. And the kids were having more technical issues.” She explained in more detail about one of the workplace safety student guides, sharing that the school’s blocker kept her students from accessing the websites in the guide. She continued to explain the struggle of “just being able to type on the document. It seemed that there were images that were inserted into the Google docs as students can't type on those images.” Requesting that it be made “more tech friendly”, Rosanne shared similar sentiments stating “I know they have been kind of transferred over as Google docs [but they] are still not super user friendly.” She continued to describe how

It's frustrating on my end when I've got 30 kids in a classroom and they're all having problems and all I'm doing is running back and forth, to show them how to edit this text box ... I'm having to do like I.T. support in the process of teaching that and that gets really frustrating.

Even for those that are printing the student guides from The Council, there are still formatting issues. Naomi praised the Career Exploration and Planning foundational guide, but expanded that she felt “the thought is there, it's just not completely ready to print off and hand to students on some of them.” She continued to explain how

some things will be on one page and you print it off and it's on another page and it's trying to ask you a question that goes with the other page and it doesn't make sense the way you look at it. And so it confuses [the students].

The second perceived resource was *better integration between SAE for All and the AET*. North Carolina has provided the AET to all agriculture programs at no cost to the local program since 2012 (Joshua Bledsoe, State Director, personal communication, October 2022). SAE-based award submissions within the state transitioned to the AET exclusively in 2020, requiring that any students submitting applications need to have their records stored in the website. Several participants felt that the AET does not align with the current SAE for All model which required teachers to be creative in giving instructions to students for record keeping and accountability in class. Dolly was vocal that “I do not feel like [SAE for All] lines up with the AET 100%.” Participants were especially frustrated with the redundancy involved in having students use the AET to enter records then share information with their LMS or jumping between other programs. Emmylou mentioned the multi-step process to enter grades by saying “grading on AET is not very easy, or is at least one more program I have to go to grade and so that's where for me that breaks down, is even if I make them record it then it's the follow up.” Rosanne echoed this sentiment indicating that using AET “becomes two totally separate pieces and they don't they're not really merged together and married well” which took away more of her instructional time because “you're having to teach about a foundational SAE and all these different components with it, and then you're having to teach how to use AET and, like those two things are not meshing with one another.” Dolly felt we should integrate tools when possible, adding:

Instead of doing a Google Doc on workplace safety, I think there's a workplace or safety quiz on the AET. You know, and then Ag Explorer, those kind of line up with it, but it's just a lot of click this link and come back and put it on this document, whereas if we just did everything on the AET, then you can run reports and it's not going so much back and forth. It's like the two programs are fighting with each other to be used.

The third perceived resource was *middle school specific* guides and examples. Loretta, who teaches in a middle school program, indicated that some of the activities are not a fit for students at that age and thought teachers would benefit from “simplification of materials”. She specifically referenced resumes and the fact that her students do not have much to put on a resume and talked about the fact that she has to help students understand that the students who are profiled in the SAE Video Library [a National FFA resource used in an activity within the foundational SAE for All guides] are not reflective of the kind of projects a middle schooler can do. She offered that “if there were videos on, like it doesn't have to only be videos on the best SAEs in the world. They can make videos on the basic simple ones. And that would probably not scare kids as much.” Tammy echoed this sentiment, stating “the big thing is you know remembering that middle school is exploratory, literally all of our classes start with ‘exploring so and so’. And then I just if we had resources that would kind of coincide with that.”

The fourth perceived resource is a *modified curriculum and/or performance-based measure (PBM)*. In recent years, the state mandated assessment was updated to include completion of a foundational SAE. Some teachers told us this state assessment called performance based measure (PBM) is what moved them to begin implementing SAE for All. This was positive in exposing teachers to the SAE for All resources. In other cases, the

perception was less positive. Willie said that since the PBM was state-mandated, “whatever is forced on you [is] negative, and so the perception is it's not going to be a positive change, where, in reality, it's actually a necessary change for the inclusivity piece of it.” Many participants indicated they were only using the SAE for All model because of the PBM, but did not feel they had enough time for students to complete the full foundational guide. Kenny shared that his program tried to complete SAE for All foundational activities, but “in all honesty I probably get through like one or two activities out of the five that's recommended and then, we just kind of move on”. Rosanne agreed

I like what SAE for All is intended to do, and either there needs to be a lower amount of what we have to cover otherwise in curriculum or the SAE for All stuff needs to kind of change or shift a little bit I'm not sure what needs to happen, but I don't think we need to scrap the whole thing. It's just, something needs to change within this.

Kenny, after learning about SAE for All, entered the various levels of foundational activities into a choice board where students could choose the activity they complete for each aspect of the foundational SAE. He thought that was a solution for differentiation. He gave that idea up when the state curriculum assessment had every student at the intermediate level.

The fifth resource teachers requested was *professional development*. Keith was specific that he needed to hear from ag teachers. He said, “I want to hear people that are doing it or trying to do it and what they're doing”. Willie agreed. He wanted “some firm examples of success stories of SAE for all utilization especially, you know, ag teacher success stories, I think the actual concreteness of it would be very helpful.” Willie thought it would go a long way if the messaging during professional development was “it's the same thing, but better”. He argued that it should not be pitched as a new model “because it's not different. I have done enough of that study myself - it's not different. It's just a different way to look at the same opportunity.”

Patsy thought teachers needed to walk through it, “like almost give it to them as an assignment” with the idea that this would “show them, like ‘Look how easy it is.’ Tammy, a middle school teacher, wanted some professional development in small groups. She indicated there's a lot of new teachers [in my county] and I think I'm the only one, as of right now, who's doing SAE like at all and just hearing from them they're taking on different loads, like trying to get FFA setup as well, so I feel like if we had some sort of workshop series for someone to come and talk to our PLT [professional learning team] that might help them.

Conclusions/Recommendations/Implications

This study recognizes the perceived barriers to implementing SAE for All to its fullest potential and perceived resources needed to meet that goal. We recognize that asking teachers to supervise individual SAE projects for every student in their programs is not an easy task.

Student Barriers: Each of the student barriers that were identified including motivation, communication, and transportation are all within the control of the agriculture teacher. In alignment with Ajzen's (1991) Theory of Planned Behavior, the teacher's attitude about SAE is key. Presenting the components of SAE for All in a positive light, requiring it as a grade, being aware of the most recent SAE model, and communicating regularly about the project can vastly

improve students' motivation to complete the project (Bryant et al., 2022; Doss & Rayfield, 2019; Lewis et al., 2012; Marzolino & McKim, 2022). To address the shift in communication experience for today's SBAE students it is recommended that national SAE for All stakeholders create a lesson plan or provide suggested activities that correspond with foundational and immersion SAEs. These could include activities that walk students through how to interact with community members through phone, email, and in-person professional scenarios. It is also recommended that national and state SAE for All stakeholders intentionally provide examples of SAE projects that can be accomplished at school or without transportation. A specific focus on school-based enterprise, service learning, and research projects is recommended.

Teacher Barriers: The SAE for All model can be considered abstract, which is a challenge for many teachers. Providing concrete examples of successful implementation of SAE for All from teachers is a necessity. As state staff, national stakeholders, and teacher educators plan professional development opportunities and coursework related to SAE and SAE for All, consider highlighting current teachers, with varying years of experience, to showcase how they are making the model work for their programs.

The findings show that teachers are placing high stock in FFA awards, which are currently focused on immersion projects with no reference to foundational projects. Consistent with recommendations from Bryant et al. (2022), it is imperative that FFA recognition for SAE-based awards is aligned with the SAE for All model as quickly and intentionally as possible. Wording in degree applications should be specific about what SAE experiences *count* towards earning the degrees. Proficiency award applications could have a foundational component or a foundational award application could stand alone. National and state associations should identify creative ways to recognize SAE, possibly through chapter-wide SAE applications like 100 percent SAE participation or school-based enterprise or service learning awards.

Consistent with the literature, time was a limiting factor in implementation of SAE for All (Shoulders & Toland, 2017; Steele, 1997; Wilson, 2022). The teachers that were the most familiar with SAE for All and modified the available resources to fit their programs appeared to be the biggest advocates for it. It is recommended that teachers set aside time to learn and adapt the model to best fit their program. Time could be provided during state professional development conferences or during another time that SBAE teachers are already together. Teacher educators should provide pre-service teachers time to read through the SAE for All guides and ask students to prepare an implementation plan for their future programs.

Resources: As we address resources needed, we found it noteworthy that many of the same challenges noted by Lambreth (1986) and highlighted in Steele (1997) remain issues including inadequate resources, large class sizes, and the demands of other job responsibilities.

Teachers were clear with us that the guides were not ready-to-use for them. From issues with images and pagination to incompatibility with their local LMS, the SAE for All guides required teacher time and energy to use. Lowering the technological barriers and the adaptation required will increase teacher use. Teachers also want the guides to be realistically achievable for their students in a single class period. *Trimming the fat* from the guides can accomplish that goal, but the material edited out could still be included in the resources as supplemental materials.

Middle school teachers were clear the SAE for All model and the awareness foundational student guides are too advanced for their students. We believe there are two options to address this need. Option one is creating an *exploratory* foundational level below awareness that is designated specifically for students in grades 6-8. Option two is to scale the entire SAE for All model to fit middle school programs. This model could include the *exploratory* foundational projects and transition to immersion projects that are appropriate for this age group, specifically school-based, service learning, and research projects. Along with these recommended edits to the SAE for All model, we recommend the inclusion of realistic middle school examples throughout SAE for All resources.

Teachers were clear that the North Carolina curriculum was too full to allow enough days to address the items in the guides. They talked about either needing to decide what portion of the curriculum to skip so they could spend time on SAE for All or making the decision to do some aspects of SAE and leave the others out. As curriculum is revised, consider providing additional days for SAE related instruction or integrating SAE into what is being done within the curriculum. The first generation PBMs had every student at the intermediate level which goes against the differentiation built into the SAE for All model. Allow teachers flexibility in which foundational activities are required of students.

There was a consistent frustration from participants with the lack of clarity in record keeping practices for foundational SAEs using the AET. In a study by Aviles (2017), she predicted the complexity of the AET would cause some teachers to discontinue its use and we are indeed seeing some teachers who had been implementing the AET for student SAE recordkeeping in their classrooms and have stopped. Teachers are already tasked with using a LMS and find it difficult to record and grade SAEs in multiple places while also navigating a third resource of the SAE for All guides. For the AET to continue to be a useful resource for teachers, a smoother alignment with SAE for All is needed. It is recommended that the AET either consider integrating foundational activities into the website or creating related resources for teachers to use. Resources could be handouts for students that align with specific foundational guides or lessons for teachers to support SAE for All integration into the AET.

The request for additional professional development was addressed by every participant. State and national stakeholders should incorporate SAE for All specific professional development into every opportunity for teachers. Special consideration should be given for middle school specific content. National and State staff can offer more SAE for All train-the-teacher events, and/or bring in presenters that have successfully used the model. Offering pre-recorded or asynchronous resources can help, but teachers need the time to understand and work with the innovation and decide how to integrate it in their program.

In reference to the three-circle model of SBAE, Croom (2008) posited that “for the model to be successful to a significant degree, there must be a commitment by all stakeholders to deliver all components collectively to those students who can be served by it” (p. 118). This attitude is applicable to SAE for All implementation. For the model to positively impact all SBAE students, all stakeholders must understand and be committed to providing students with the career and work-based learning opportunities afforded through SAE for All.

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An Intersectional Research Synthesis of Multicultural Education Studies

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Abstract

In recent years educational institutions and researchers have worked to address issues of inequality and oppression in education. In the Journal of Agricultural Education (JAE), there are several studies published that seek to address these concerns in the context of multicultural education. To best depict the state of the literature in multicultural education studies, a research synthesis of JAE articles focusing on multicultural education was conducted. This review analyzed the research designs utilized, the cultural representations within multicultural studies, and the intersectional nature of these studies. Results indicate a lack of qualitative and critical methodologies employed, a large focus on race and ethnicity in multicultural studies, and a lack of intersectional frameworks in literature. Authors call for a shift toward social justice frameworks that includes an expansion of qualitative and critical methodologies, intersectional research, and the expansion of oppressed groups represented.

Introduction

“Revolutionary leaders cannot think *without* the people, nor *for* the people, but only *with* the people”

– Paulo Freire, *Pedagogy of the Oppressed*

Educators have long searched for strategies and philosophies of “how to teach effectively from a clear social justice perspective that empowers, encourages students to think critically, and models social change” (Hackman, 2005, p. 103). Social justice education envisions a liberated society, and educational spaces, where all groups are mutually included in decision-making, knowledge creation, and resource distribution, and are physically and psychologically safe (Bell, 2007). To achieve this goal, educators must be willing to question the norms and systems in place, while working *with* not *for* the oppressed (Freire, 1970). Philosophies of social justice draw largely from ideologies like critical pedagogy put forth by Freire (1970) in *Pedagogy of the Oppressed*. In this work, Freire describes the relationships between race, class, and power in educational spaces which creates oppressive systems for marginalized groups. In addition to critical pedagogy, social justice education shares ideologies with several educational philosophies and strategies including culturally relevant pedagogy, culturally responsive pedagogy, and multicultural education (Cho, 2017).

Social justice education frameworks offer a restructured vision of multicultural education emphasizing “a more integrated approach for promoting social justice and equity than earlier multicultural teacher education” (Cho, 2017, p. 11). In this reimagined framework, social justice not only acknowledges different cultures but also examines the various systems of power and privilege that oppress groups of people (Hackman, 2005). In the *Journal of Agricultural Education*, scholarship related to social justice issues is still commonly framed around multicultural education goals. Before our discipline can shift toward more progressive and

liberatory frameworks like social justice education, it is necessary to examine the state of the literature on multicultural education.

Literature Review

Social justice frameworks expand the potential of multicultural education as they not only acknowledge different cultures, but they analyze the systems in society that lead to inequality and oppression (Hackman, 2005). Systemic frameworks of power and privilege are necessary as power inequities in society lead to oppressive systems (David & Derthick, 2018). David and Derthick (2014) highlight this linkage between power and oppression:

Oppression occurs when one group has more access to power and privilege than another group, and when that power and privilege is used to maintain the status quo (i.e., domination of one group over another). Thus, oppression is both a state and a process, with the state of oppression being an unequal group access to power and privilege, and the process of oppression being the ways in which inequality between groups is maintained (p. 3).

Educational institutions are directly related to the power structures in society and systemically deny some students equitable education (Banks, 2016). Additionally, oppression allows explanations for why some students are disadvantaged for belonging to a group, or multiple, that experience oppression (e.g., ageism, ableism, racism, sexism, heterosexism, xenophobia, religious intolerance, classism; David & Derthick, 2018). Educational institutions are directly related to the power structures in society and therefore systemically deny some students equitable education (Banks, 2016). Shifting toward social justice frameworks will allow scholars and educators alike to not only acknowledge differences, but analyze the systems that create a difference or “othering” (Bell, 2007; Hackman, 2005)

Multicultural Education

Agricultural educators have long searched for solutions for teaching diverse populations. In 1971, Schmitt and Bender proposed ten premises for preparing agricultural educators in teaching diverse populations. Since this publication in the *Agricultural Education Magazine*, several studies have been published in the *Journal of Agricultural Education* to address multicultural education goals. At its core, multicultural education emphasizes “the idea that all students – regardless of their gender; sexual orientation; social class; and ethnic, racial, or cultural characteristics – should have an equal opportunity to learn in school” (Banks, 2016, p. 2). Multicultural education believes that some students are better situated for learning because of their societal positionality (i.e., group membership) and calls on educators to acknowledge these cultural differences.

Multicultural education largely grew from the Civil Rights movements in the 1960s and 1970s when various oppressed groups in society pushed for human rights, including in education (Sleeter & Grant, 1987). Specifically, movements toward desegregation of schools, multilingual education, education for exceptional students, and curricular representation were at the forefront of these movements (Banks, 2016; Sleeter & Grant, 1987). Anti-racist educational practices were

at the forefront of multicultural education concerns (Sleeter & Grant, 1987) which were quickly followed by calls for expansion to address other systemic forms of oppression including ableism, classism, heterosexism, and sexism (Bell, 2007).

As multicultural education has developed, educational institutions have worked to address the unique needs of various groups in several dimensions. At first, many educators may think of multicultural education in the context of race and ethnicity (Banks, 2016). However, Banks (2016) cautions against this assumption as “teachers who cannot easily see how their content is related to cultural issues will easily dismiss multicultural education with the argument that it is not relevant to their disciplines” (p. 15). This assumption of multicultural education stifles the possibilities of equity and justice-oriented educational approaches. Further, multicultural education encompasses several dimensions of school practices and reform that are widely applicable including (1) content integration, (2) the knowledge construction process, (3) prejudice reduction, (4) an equity pedagogy, (5) and an empowering school culture and social structure. While there are dimensions of practice, it should be noted that multicultural education views a *process* of education, rather than just things that we *do* to address issues of inequality (Banks, 2016).

(In)Visibility in Research and Education

It is imperative to identify ways to ensure we are working *with* the oppressed, rather than *for* or *without* the oppressed (Freire, 1970) in social justice education. Therefore, social justice educational goals include being able to conduct research and create educational materials representing all communities (Buchanan et al., 2021; Murray et al., 2020; Rojas & Vincent, 2022). Research focusing on marginalized groups like BIPOC (Black, Indigenous, and People of Color; Buchanan et al., 2021) and queer individuals (Murray et al., 2020) are disproportionately lower than that of White and heterosexual populations.

For example, many studies regarding oppressed groups frame around assumptions and deficit models (i.e., only outlining negative outcomes from an individual perspective; Murray et al., 2020). When blame is attributed to an individual rather than the systems that disproportionately affect individuals, negative stereotypes are perpetuated and researchers can “intentionally or unintentionally convey that one group is inferior” (Buchanan et al., 2021, p. 1102). Qualitative methodologies can be used to provide a unique avenue to share personal experiences, relationships, groups, organizations, and cultures (Tracy, 2020).

Outside of the context of research, the representation of marginalized groups in education directly affects how and what students learn (Armstrong, 2021). Increasing representation in educational materials (e.g., textbooks) can create a sense of belonging for students and develop cultural authenticity of various cultures and identities (Armstrong, 2021; Rojas & Vincent, 2022).

Theoretical Framework

Considering the systemic nature of social justice frameworks, intersectionality was used as a theoretical lens to identify and examine the various systems of oppression. Intersectionality

theory stems from Black feminist perspectives and experiences that highlight belonging to multiple marginalized groups simultaneously (Chan et al., 2019; Collins, 2015; Crenshaw, 1991).

While the term *intersectionality* is relatively new, the idea that individuals have multiple identities that experience oppression is not (Collins, 2015). Intersectionality represents various ways to approach social justice (Collins, 2015). First, it can be utilized as a field of study itself, understanding the origins of social (in)justice. Second, it can be used as an analytic tool to depict the complexity of social justice and the various systems of race, class, gender, sexuality, age, ability, nation, ethnicity, etc. in relational terms. Third, intersectionality can be used to determine the work of social justice as critical praxis (Collins, 2015). In higher education and social science, intersectionality is commonly utilized as an analytic tool and will be used in this way for this research synthesis.

Crenshaw (1991) emphasized that intersectionality exists in three dimensions. The first dimension, *structural*, refers to the interlocking social structures that shape expectations for interpersonal interactions and stifle self-determination beliefs. The second dimension, *political*, highlights the interaction between political and social justice-oriented movements marginalizing subsets of individuals (i.e., othering the experiences of an already marginalized group). The third dimension, *representational* highlights the influence of media-based images and stereotypes that ignore multiplicative complexities (Crenshaw, 1991). These dimensions highlight the ways in which systems work to oppress individuals and how multiply marginalized individuals can experience multiple oppressions simultaneously. This research synthesis will analyze the ways in which these dimensions have been represented in current multicultural education scholarship and the opportunities to expand intersectional applications.

True liberation of oppressed individuals cannot occur without addressing and analyzing the various social systems and norms in society that create and privilege certain groups over others (Crenshaw, 1991). Therefore, intersectionality provides the best tool to analyze the state of multicultural education literature in JAE and our preparedness to shift toward social justice frameworks.

Purpose and Objectives

Multicultural education and social justice studies are imperative to research priorities outlined in the *American Association for Agricultural Education National Research Agenda* (Roberts et al., 2016). Specifically, social justice studies like this systemic review allow for explanations of the ability to: (a) recruit diverse populations into agriculture and natural resource careers (Priority 3, Research Question 1), (b) create meaningful learning environments for agricultural education programs to continually evolve and meet current needs of students (Priority 4, Research Question 3), and (c) deliver efficient and effective agricultural education programs to effectively engage with diverse audiences (Priority 5, Research Question 2).

Within our discipline, research has been growing in the areas of multicultural education. To be able to shift toward social justice frameworks, it is important to analyze the state of the literature within multicultural education studies. Specifically, it is important to analyze the frameworks

and representations currently being utilized to identify new possibilities in social justice scholarship.

This research synthesis was guided by three overall objectives:

1. Identify the research designs (methods, study populations, theories, and paradigms) utilized in JAE multicultural education studies.
2. Identify the cultural representations (ability, age, gender identity, language, race/ethnicity, religion, sexuality, socio-economic status) present in JAE multicultural education studies.
3. Analyze the presence of intersectionality (in identities or as a framework) within JAE multicultural education studies.

Methodology

The study conducted was a research synthesis (Cooper & Hedges, 2009) of cultural representation in multicultural education scholarship published in the *Journal of Agricultural Education* (JAE). With an increase in multicultural education studies in recent years and calls for more research addressing the needs of diverse learners (Murray et al., 2020), this research synthesis is necessary to depict the current state of the literature. Additionally, this review serves as a critique and a potential reconceptualization (Torraco, 2005) of multicultural education studies within the profession.

Prior to conducting the research synthesis, the authors set research parameters in line with the research objectives. Authors only searched for publications on the JAE database, given the focus on multicultural education scholarship. Inclusion and exclusion criteria were created to identify the articles that were most applicable to this review (McKenzie et al., 2019; Torraco, 2005). Criteria for inclusion were determined based on guidance from McKenzie et al. (2019) to identify study designs, populations, and time periods of interest. Therefore, the authors determined the following selection criterion to be included in the research synthesis: (a) empirical research studies (i.e., not philosophical), (b) must have focused on multicultural education, and (c) must have explicitly identified a theoretical or conceptual framework. Additionally, due to terminology changes within multicultural education scholarship, only articles published within the last 20 years were included. It should also be noted that article identification occurred during the Fall of 2022; therefore, there may be newer publications that are not included in this review.

In addition to inclusion and exclusion criteria, authors designed search strategies to identify articles in the JAE database (Lefebvre et al., 2019). During the search, authors chose to avoid words that identified specific groups of marginalized people (e.g., *race*, *gender*) as many studies use these as identifiers of participants which would complicate the search results. Additionally, words like *culture* or *cultural* were avoided due to the results of *agriculture* or *agricultural*, which would again complicate the search results. Therefore, only the keywords *multicultural education* were used to search for articles. This initial search of the JAE database resulted in 21 articles with the keywords *multicultural education* appearing in the title, abstract, or article keywords. From this search, six articles were excluded from the research synthesis. Three articles did not focus on multicultural education (i.e., mentioned it in recommendations), two

articles did not specify a theoretical or conceptual framework, and one article was not an empirical study. After assessing search results for exclusion criteria, fifteen (N = 15) articles were deemed worthy of review and inclusion in the study.

After article identification, articles were read and annotated following the research objectives and how findings would be grouped (McKenzie et al., 2019). To achieve the research objectives, notes were kept identifying the methodology, study population, theoretical and/or conceptual frameworks, presence of critical paradigms, culture(s) of focus, and representation of queer identities. Critical paradigms were assessed based on criteria from Tracy (2020) that are typical of critical research paradigms including the ontology that reality is constructed through power relations; the epistemology that knowledge is produced through power; and that the research was intended to disrupt systems of power and challenge structural 'isms' (e.g., sexism, racism).

When annotating the inclusion of queer identities, authors looked for the inclusion of sexual orientations/sexuality and gender/gender identity. Queer identities were further described as these can exist on a spectrum, rather than as single binary identities. Therefore, the level of inclusion and the presentation of identities were described. The inclusion of queer identities was categorized by the level of presence in the study, with *primary* = focus of the study; *secondary* = included in the study, but not the central focus, and *tertiary* = emerged in the findings or was used to analyze findings. Additionally, queer identities were analyzed based on the presentation of identities as *binary* (i.e., male or female, straight or gay), or as *non-binary* (i.e., included a wide array of identities).

Finally, the authors reviewed articles in the research synthesis for the presence of intersectionality. The authors looked for intersectionality within cultures and identities presented in the study (e.g., assessing perceptions of Black and gay individuals). Additionally, authors looked for intersectionality as a framework within the three dimensions (structural, political, representational) outlined by Crenshaw (1991) or the three applications (field of study, analytical tool, critical praxis) defined by Collins (2015).

Findings

Over the course of the 20 years of publications studied, 15 met the research criterion. From the 15 articles, findings were organized based on research objectives. Research objective one sought to identify the research design of JAE multicultural education studies. The authors noted the methodology, study population, theoretical and/or conceptual framework, and the presence of a critical paradigm to explain the research designs used. Of the 15 articles reviewed, studies mostly utilized quantitative survey methods ($n = 10$), studied post-secondary students (i.e., undergraduate, or graduate students; $n = 7$), and did not use a critical paradigm ($n = 10$).

Furthermore, from these studies, there were 17 different theoretical or conceptual frameworks included in the designs. Only one of the 17 frameworks appeared twice among the manuscripts selected. Findings related to research objective one are further described in Table 1.

Table 1*Research Designs Present*

Study #	Methodology	Study Population	Critical Paradigm
Study 1	Quantitative (survey)	Secondary Students	Yes
Study 2	Qualitative (case study)	Secondary Students	Yes
Study 3	Qualitative (content analysis)	Undergraduate Students	Yes
Study 4	Experimental	Undergraduate Students	No
Study 5	Qualitative (content analysis)	Undergraduate Students	No
Study 6	Qualitative (case study)	Graduate Students	No
Study 7	Quantitative (survey)	In-service SBAE Teachers	No
Study 8	Quantitative (survey)	In-service SBAE Teachers	No
Study 9	Quantitative (survey)	Undergraduate Students	No
Study 10	Quantitative (survey)	Post-secondary Educators	No
Study 11	Quantitative (survey)	Secondary Students	Yes
Study 12	Quantitative (survey)	Undergraduate Students	No
Study 13	Quantitative (survey)	Undergraduate Students	No
Study 14	Quantitative (survey)	Undergraduate Students	Yes
Study 15	Quantitative (survey)	In-service SBAE Teachers	No

Research objective two sought to determine the cultural representations among JAE multicultural education papers. Six of the studies included more than one culture in their study. Findings show that race/ethnicity was the most prolific focus of multicultural education studies with all fifteen ($n = 15$) encompassing racial and ethnic identities in their study. Sexuality and gender followed race and ethnicity, with both being included in three ($n = 3$) studies. Further descriptions of findings are represented in Table 3.

Table 2*Culture(s) Represented*

Cultures Present	<i>f</i>	%
Ability	1	7
Age	1	7
Gender Identity	3	20
Language	1	7
Race/Ethnicity	15	100
Religion	2	13.3
Sexuality	3	20
Socio-economic Status	2	13.3

Research objective two also sought to determine the emphasis and presentation of queer identities (i.e., sexual orientation and gender identity). Sexual orientation was not included as a primary emphasis in any study ($n = 0$). However, sexual orientation was included as a secondary emphasis in three studies ($n = 3$), and tertiary in one study ($n = 1$). Gender identity was found as a primary emphasis in one study ($n = 1$), secondary in two studies ($n = 2$), and tertiary in three studies ($n = 3$). Presentation of these queer identities was always in a binary form (e.g., straight or gay, man or woman). Further descriptions of queer identities are described in Table 4.

Table 3
Presence of Queer Representation

Study #	Sexual Orientation		Gender Identity	
	Emphasis	Presentation	Emphasis	Presentation
Study 1	Secondary	Binary	None	None
Study 2	None	None	None	None
Study 3	None	None	None	None
Study 4	Secondary	Unclear*	Secondary	Binary
Study 5	None	None	None	None
Study 6	Tertiary	Binary	None	None
Study 7	None	None	Tertiary	Binary
Study 8	None	None	Tertiary	Binary
Study 9	None	None	None	None
Study 10	None	None	Secondary	Binary
Study 11	Secondary	Binary	None	None
Study 12	None	None	None	None
Study 13	None	None	Tertiary	Binary
Study 14	None	None	None	None
Study 15	None	None	Primary	Binary

Note. None = no presence in the study reviewed. *Listed as a sexual orientation in the study but did not mention specific sexualities to identify binary or non-binary.

Research objective three sought to determine the presence of intersectional identities and frameworks in JAE multicultural education studies. From the 15 articles included in the review synthesis, intersectionality in identities was seen in two ($n = 2$) of the studies. Most studies ($n = 13$) did not have a representation of intersectionality in the study. None of the studies utilized intersectionality as a framework. Frequencies and percentages related to research objective three are displayed in Table 4.

Table 4
Presence of Intersectionality

Presence	<i>f</i>	%
Intersectionality in Identities	2	13.3
Intersectionality as Framework	0	0.0
None	13	86.7

Discussion, Conclusions, and Recommendations

Prior to discussing the findings, we the authors want to emphasize that while we are critiquing the current literature in multicultural education, we would like to commend the authors who have tackled issues of social justice through multicultural studies in the profession. There is little scholarship related to multicultural education initiatives within JAE, and the articles reviewed in this study should be celebrated for tackling such complex issues. However, we are emphasizing the need for future scholarship to expand qualitative inquiry, cultures of interest, intersectional frameworks, and ideologies employed in the research process to continue the fight toward the liberation of oppressed groups.

We commend scholars within JAE for applying unique and diverse research designs to search for solutions related to the goals of multicultural education. Of the 15 studies reviewed, only two studies shared the same design (methodology, theoretical/conceptual framework, study population, and paradigm) as they were publications from the same study, and 17 different theoretical/conceptual frameworks were used as a tool for developing the study and interpreting the data. We posit that scholars with interests in multicultural education continually seek out new and innovative research designs. Future scholarship related to social justice education should continue to employ unique and innovative research methods. In concert with this recommendation, further qualitative studies should be conducted to explore lived experiences of marginalized communities in school-based agricultural education (SBAE) to identify the most impactful practices toward social justice initiatives.

Most of the studies utilized post-secondary student populations. This is likely due to the greater access post-secondary researchers have to their student populations at the university level than secondary students and in-service teachers. It can be challenging to work with youth populations especially given the protections needed for their participation (Tracy, 2020). Furthermore, receiving approval for institutional review boards to collect data among underaged youth on issues related to multicultural education is daunting. Similarly, access to in-service teacher populations can be difficult as well depending on the scope of the study. Future scholarship should continue to pursue these populations as secondary students and in-service teachers have the most current accounts of SBAE classrooms in relation to social justice initiatives. Research among post-secondary educators is also very limited in multicultural education scholarship with only one study ($n = 1$) in this synthesis surveying university faculty. We encourage the profession to continue to diversify the participant pool in order to assist scholars in the field in developing models that can benefit various communities at different stages in their life. Knowledge surrounding post-secondary social justice initiatives in agricultural education programs can be bolstered through researching this population further.

Further analyses of research objective one found few studies employed critical theories and paradigms. Our conclusions should be cautioned as we are interpreting their paradigms against one author's recent definition. The studies at the time and the authors likely were providing critical work at the time of publication, however, we are critiquing the *systemic* emphasis on power and privilege when evaluating critical theory and paradigms. While we recognize that every researcher's worldview is uniquely their own, we encourage future scholarship to employ critical theories and frameworks more to address systemic inequalities in agricultural education.

Research objective two sought to identify the cultures that were being researched within multicultural education. All fifteen articles were found to include race and/or ethnicity in their study. While we recognize that these two terms are not synonymous or interchangeable, we chose to categorize them together as they were defined differently in each article to represent racial and/or ethnic identities/groups. The focus on race and ethnicity found in these multicultural education studies is unsurprising, as multicultural education developed from the Civil Rights movements in the 1960s which mainly focused on inequalities related to race (Sleeter & Grant, 1987). While there is a strong focus on race and ethnicity in JAE multicultural education studies, authors are not calling for a reduction in scholarship exploring racism.

However, we are encouraging scholars to expand areas of focus to include more oppressed groups (e.g., women, transgender people, sexual minorities, individuals of low socio-economic status, religious minorities, etc.) in their scholarship and in intersectional ways.

Research objective two also described the emphasis and presentation of queer identities in JAE multicultural education studies. These articles were found to display heteronormative ideologies through their exclusion of queer identities. There were six articles that did not include any form of queer identity, and only one study included both sexual orientation and gender identity. None of the articles included sexuality as a primary focus and zero included non-binary representations of sexuality or gender identity. These conclusions support the work of Murray et al. (2020) that acknowledges a deficit of published work in JAE. We support calls to action from Murray et al. (2020) to advance the inclusion of queer people in agricultural education scholarship to amplify the voices of queer individuals and provide the most impactful practices for working with students who identify in this community.

The final research objective, number three, analyzed JAE multicultural education articles for the presence of intersectionality. Intersectionality was seen in two of the articles that included identities in an intersectional way. However, these two articles did not utilize the dimensions (Crenshaw, 1991) or applications (Collins, 2015) of intersectionality in the study. Therefore, the intersectional representations found were likely coincidental. Zero studies in the research synthesis utilized intersectional frameworks and the majority of multicultural studies researched one culture. Future scholarship will need to encompass intersectionality in social justice studies to ensure that all communities and their intersections are represented (Buchanan et al., 2021). We currently have very limited knowledge in the profession about the most impactful practices for ensuring multiply marginalized individuals are seen, valued, and included in agricultural education programming. Intersectionality provides a new avenue of scholarship in our profession to analyze the various realities that exist for students in our programs and can help address social justice in agricultural education.

As with all research, there are limitations that should be addressed. First, not all articles published in JAE that address issues of multicultural education and/or social justice may have been included due to the search parameters that were set. Additionally, as this area of research is growing, new studies may be published that address some of the critiques mentioned in this discussion and the time context of this study should be noted. Finally, we also acknowledge that our critiques and identification of paradigms come from our unique perspectives and lived experiences. Therefore, they may not represent the interpretations of the initial authors.

In conclusion, it is inevitable that we will all encounter individuals in our lives who come from different backgrounds, identify differently, and have unique experiences. Until we are better able to address issues of inequality, privilege, and oppression, in our discipline through intersectional and critical studies, individuals who experience marginalization cannot truly be liberated. We call upon educators and scholars in our discipline to begin to incorporate social justice educational practices in their classrooms and research.

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Determining the Needs of School-Based Agricultural Education Teachers in Oklahoma

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Teacher attrition has reached critical levels in the US and globally, with one in every four teachers not remaining in the profession past year three. For 32 years, research surrounding school-based agricultural education (SBAE) teacher needs has been studied, finding that program management, administrative tasks, public relations, SAE development, instructional technology, behavior management, and work-life balance have been recurring needs, yet nothing has been done to proactively address these needs to increase job satisfaction. One-size-fits-all professional development, training, and workshops are ineffective at providing the human capital development needed to meet these needs. The Conceptual Model of Support for SBAE Teachers guided this study in determining the current needs of SBAE teachers in Oklahoma through the distribution of a 42-item instrument. Thirty-six of the 42 items achieved a mean score indicating a need. A statistically significant difference was found between SBAE teachers' self-reported need scores based on the personal and professional characteristics of participants. It is recommended that purposeful professional development in-service and practical resources be developed to address the unique and specific needs of SBAE teachers.

Introduction

Teacher attrition has reached critical levels in the US and globally, with one in every four teachers not remaining in the profession past year three (OECD, 2021). Attrition rates increase for teaching positions with greater responsibilities like; special education, science, technology, engineering, and mathematics (STEM), and agricultural education (Nguyen & Springer, 2019). Since 1917, school-based agricultural education (SBAE) has reported a lack of teachers to meet program demands (Eck & Edwards, 2019). Further exacerbating the concerns was the large percentage of SBAE teachers approaching retirement and early-career SBAE teachers not remaining in the profession to retirement (Smith et al., 2018). Begging the questions, how do we make actionable change to this trend, and how do we increase SBAE teacher career retention?

For 32 years, research surrounding SBAE teacher needs has found program management, administrative tasks, public relations, SAE development, instructional technology, behavior management, and work-life balance as recurring needs, yet nothing has been done to proactively address these needs to increase job satisfaction (DiBenedetto et al., 2018; Doss et al., 2022; Shoulders et al., 2021). These historic gaps in specific human capital skills and community networks are further compounded by the stress and anxiety SBAE teachers face while attempting to manage a complete program (Marsh, 2022; Shoulders et al., 2021).

Nationally, school district policies have adopted measures to alternatively and emergency-certify teachers to help alleviate the pressure of filling positions with quality professionals (NCES, 2018; US Department of Education [USDOE], 2016). Emergency certified teachers represent one percent of the teaching population in Oklahoma, as this number has risen from 32

individuals in 2011 to over 3,000 with emergency credentials in 2019 (NCES, 2018; Oklahoma State Department of Education [OKDOE], 2022; US Department of Education, 2016). Leaving novice emergency teachers facing barriers that limit their teaching effectiveness if they do not receive content, pedagogy, and experience prior to being placed in the classroom (Mobra & Hamlin, 2020).

Alternatively and emergency certified teachers are presented with unique challenges, just as other personal and professional characteristics of SBAE teachers contribute to differences in an individual's level of need (Marsh, 2022). For example, female SBAE teachers have identified SAE and FFA tasks to be high stress responsibilities, with 60% finding that proficiency application preparation and 57% finding that FFA Banquet planning are high to very highly stressful events (King et al., 2013). In addition, classroom responsibilities like reports and paperwork were found to be highly stressful by 57% of female SBAE teachers (King et al., 2013). Teacher age and career tenure seem to reduce the stress level reported by female SBAE teachers, although Smalley and Smith (2017) found time to be a major stressor for individuals who are trying to balance work and life responsibilities.

According to Huberman's *Teacher Career Cycle Model* (1989), the early-career, mid-career, and late-career phases have distinctive characteristics that influence teachers' needs. Early-career SBAE teachers are characterized by *survival and discovery*, motivating them to abandon their personal boundaries to succeed in the profession, and limiting their work-life/balance, leaving them to struggle in silence (Huberman, 1989; Steffy & Wolfe, 2001; Traini et al., 2020). While the mid-career phase is the most extensive of career phases, characterized by *stabilization, experimentation, reassessment, and self-doubt* influenced by teachers' reflection on their progression within the profession. Obstacles identified during the mid-career phase include lack of time, work-life balance, content and curriculum resources, professional development, and networking to improve and energize practice (Huberman, 1989; Smalley & Smith, 2017; Steffy & Wolfe, 2001). Late-career teachers are characterized by *serenity, conservatism, or disengagement* with the need to find meaningful ways to engage and challenge themselves to continue growing (Huberman, 1989; NAAE, 2015; Steffy & Wolfe, 2001). These personal and professional characteristics make each SBAE teacher unique, varying their individual needs to be successfully retained within the profession (Marsh, 2022). Furthermore, Klassen & Chiu, (2010) found that one-size-fits-all professional development, training, and workshops are ineffective at providing the human capital development needed to meet these needs. Considering the disparity between SBAE teachers' unique needs, how do we adequately support these teachers to retain them throughout their career?

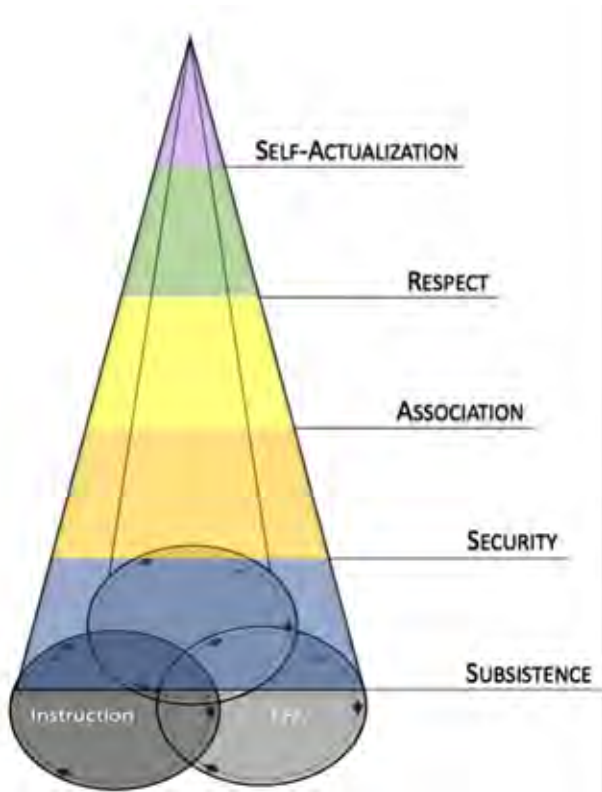
Theoretical/Conceptual Framework

The Conceptual Model of Support for SBAE Teachers was developed to provide a human lens for evaluating the depth of 21st century program needs (Marsh, 2022; See Figure 1). The framework (see Figure 1) integrates *Maslow's Hierarchy for Teachers* (Fisher & Royster, 2016), *the Three-Component Model for Agricultural Education* (FFA, n.d.), and *The Effective Teaching Model for SBAE Teachers* (Eck et al., 2019), providing researchers a lens to evaluate the level of SBAE teachers needs within their professional roles and responsibilities to provide opportunities to develop their career-specific human capital (i.e., education, training, skills, and experiences),

ultimately increasing job satisfaction and career retention (Eck et al., 2019; Heckman, 2000; Smith, 2010). Evaluating SBAE teachers' individual needs based on personal and professional characteristics can influence professional development opportunities, resources, tools, and skills being developed and implemented to make a more impactful change and satisfy the needs of SBAE teachers (Marsh, 2022; DiBenedetto et al., 2018; Klassen & Chiu, 2010).

Figure 1

Conceptual Model of Support for School-Based Agricultural Education Teachers



Purpose and Objectives

The purpose of this study was to determine the current needs of SBAE teachers in Oklahoma. The research questions guiding this study were:

- 1) What are the current needs of SBAE teachers in Oklahoma, and
- 2) Do needs differ based on SBAE teachers' personal and professional characteristics?

Methods

SBAE teachers in Oklahoma attending area Chapter Officer Leadership Training (COLT) conferences hosted by the Oklahoma FFA Association ($n = 372$) served as the accessible population (Privitera, 2020) for this study. The instrument was developed utilizing a previously validated list of 42-items representing the perceived needs of 21st century SBAE teachers. The instrument was established by an expert panel of SBAE supporters using a three round Delphi

approach (Marsh, 2022). The instrument was adapted to include a four-point Likert-type scale ranging from strongly disagree (1) to strongly agree (4), based on the recommendations of (Marsh, 2022). SBAE teachers attending the COLT conferences were asked to scan a QR code to complete the survey questionnaire, of which 121 teachers completed the instrument, resulting in a 34% response rate.

SPSS Version 25 was used for the data analysis of this study. Data were exported to an SPSS compatible file that would allow for descriptive statistics and the analysis of variance (ANOVA) tests to be ran comparing different variables from the study. The main comparable variables considered for analysis were 1) gender, 2) career stage, 3) total need score, and 4) need score mean. An ANOVA and normality of distribution were conducted on the data, resulting in not normally distributed data with unequal variances. Therefore, a Kruskal-Wallis test and a Welch test were ran to identify if the significance of these findings would hinder the data usage for ANOVA tests (Field, 2018). Both tests were found not to be significant for the gender and career phase, indicating that the data was fit to have ANOVA tests and the Tukey-Kramer Post Hoc analysis conducted (Field, 2018). Regional responses and certification held by the participants indicated unequal tests of normality and homogeneity of variances, indicating the need to run the Games-Howell Post Hoc test to adjust the data for these unequal data points (Field, 2018).

The personal and professional characteristics of participants are outlined in Table 1. Career phases were broken down into early career, ranging from 1 to 6 years ($n= 60$), mid-career (i.e., 7 to 15 years; $n=30$), and Late-Career or 16 or more years of experience ($n=38$), based on the recommendations of Huberman (1989).

Table 1

Personal and Professional Characteristics of Participants (n = 121)

Characteristic		<i>f</i>	%
Gender	Female	45	37%
	Male	76	62%
Career phase	Early Career (0 - 6 years)	59	48%
	Mid-Career (7 – 15 years)	31	25%
	Late Career (16 – 39 years)	31	25%
Certification pathway	Traditional	108	89%
	Alternative	11	9%
	Emergency	2	1%
Region of Oklahoma	Region I	32	26%
	Region II	43	35%
	Region III	11	9%
	Region IV	22	18%

For the total need score, the 42 items were each ranked on a four-point scale of agreement, with all items being weighted equally, as McDonald (1997) recommended equally weighted summative scores to be optimal when analyzing multiples components, as no weighted method can provide a better estimate. Therefore, total need scores had a potential range from a low of 42 (little or no need) to a maximum of 168 (high need). It is recommended that individual item mean scores be considered as follows: 1.0 to 1.5 (not a need), 1.6 to 2.0 (low need), 2.1 to 2.5 (somewhat need), 2.6 to 3.0 (moderate need), 3.1 to 3.5 (high need), and 3.6 to 4.0 (essential need).

ANOVA tests and Post Hoc analysis consisting of 1) gender v. total need score mean, 2) teaching certification v. total need score mean, 3) career phase v. total need score mean, and 4) Oklahoma teacher association region v. total need score mean were conducted to address the second research question. Two Post-hoc analyses were used in the ANOVA comparisons. A Tukey-Kramer test was used when group sizes were found to be normally distributed and have equal variances (i.e., gender and career phase), while the Games-Howell test was conducted for group sizes that did not have normally distributed data and was found to have unequal variances to account for the disparities in the normality and variances of the data (e.g., teaching certification and Oklahoma teaching association region), allowing for a more accurate analysis of the data when comparing abnormal group sizes to different variables being studied (Field, 2018).

Findings

Research question one sought to determine the current needs of SBAE teachers in Oklahoma. With an overall mean of 3.16 across the 42-items, there is a perceived need from Oklahoma SBAE teachers (see Table 1). Thirty-six of the 42-items had a mean need score of 3.00 or higher (i.e., moderate to high need) with the remaining six items falling below 3.0 mean score (moderate need). The identified items representing the greatest need included 1) *access to essential resources* (3.50), 2) *curriculum resources* (3.50), 3) *support from local school administration* (3.48), 4) *work-life balance* (3.46) and 5) *respect* (3.37) with a statistical power of 0.99. The effect size for the top five identified items ranged from 0.50 to 0.44. The lowest perceived needs included *training on effective online delivery techniques* (2.91), *support for hybrid teaching* (2.87), *pedagogical content knowledge* (2.87), *diversity, equity, and inclusion (DEI) training* (2.78), and *lesson planning training* (2.72). The effect size of the bottom five identified items ranged from 0.20 to 0.11.

Table 2

Current Needs of SBAE Teachers In Oklahoma (n = 121)

Identified Need	<i>M</i>	<i>SD</i>
Access to essential resources	3.50	.55
Curriculum resources	3.50	.59
Support from local school administration	3.48	.70
Work-life balance	3.46	.67

Respect	3.37	.75
Purposeful professional development	3.34	.57
Assistance/resources for training FFA teams	3.34	.61
Parent support	3.33	.69
State level support	3.32	.64
Community support	3.31	.72
Classroom/Laboratory Support	3.30	.57
FFA Support	3.26	.66
Skills and techniques for working with students with special needs	3.26	.57
Resources to help students overcome various levels of public speaking anxiety	3.26	.65
Assistance/resource to develop FFA officer teams	3.26	.61
Relevant evaluations that reflect their complete program	3.23	.73
Their planning period (i.e., not being required to cover other classes/duties during this time)	3.22	.82
Resources to recruit traditional and non-traditional ag students	3.18	.72
Agricultural mechanics skills	3.17	.62
Resources to integrate experiential learning opportunities for students	3.16	.63
Resources for awarding and recognizing SAEs	3.16	.73
Resources on FFA integration within a complete program (i.e., Program of Activities, National Chapter Award, Proficiency Awards)	3.15	.71
Accessibility training	3.14	.67
Laboratory safety resources	3.13	.68
Classroom management skills	3.12	.66
Agricultural content knowledge	3.12	.71
Greenhouse management skills	3.12	.75
Support for teacher mental health	3.11	.77
Training of "SAE for ALL" implementation	3.11	.75
Support to aligning lab facilities to program curricula	3.09	.68
SAE Support	3.08	.53
Tools to address student mental health issues	3.07	.70
Support in providing equal opportunities to all students	3.04	.72
Support to identify student mental health issues	3.03	.67
Emotional health support	3.01	.78
Laboratory management training	3.00	.72
Training to implement a variety of formative evaluation techniques	2.98	.66
Training on effective Online delivery techniques	2.91	.76
Support for hybrid teaching (i.e., in-person, virtual, simultaneous)	2.87	.84
Pedagogical content knowledge	2.87	.77
Diversity, equity, and inclusion (DEI) training	2.78	.90
Lesson planning training	2.72	.88

Note. Strongly Disagree = 1, Disagree = 2, Agree = 3, and Strongly Agree = 4

The second research question aimed to determine if SBAE teachers' needs differed based on their personal and professional characteristics. Composite needs scores had a potential range from a low of 42 to a high of 168, which were compared to each of the personal and professional characteristics (i.e., *gender, career phase, certification pathway, and regions of Oklahoma*).

Females ($n=45$) had a higher mean need score of 135.7 as compared to male respondents ($n=76$) at 117.5. This finding is statistically significant, with the lower bound of the 95% confidence interval for female respondents at 127.3 as compared to the upper bound for male respondents at 125.4. Due to the gap in the identified need score range between males and females, there is a statistically significant difference in the need scores between genders $F(2,150) = 122.034$, $p < .05$. Four of the top five needs items were found to be similar for both males and females, with females identifying *purposeful professional development* and males identifying *respect* and their fifth need (see Table 3).

Table 3

Identified Needs by Gender ($n = 121$)

Gender	Identified Need	<i>M</i>	<i>SD</i>
Female Respondents	Support from local school administration	3.48	.72
	Access to essential resources	3.44	.54
	Work-life balance	3.44	.62
	Curriculum resources	3.43	.62
	Purposeful professional development	3.40	.53
Males Respondents	Curriculum resources	3.54	.57
	Access to essential resources	3.52	.52
	Work-life balance	3.50	.64
	Support from local school administration	3.47	.70
	Respect	3.44	.72

Analysis by career phase showed that early-career teachers had a higher mean need score of 131.8 and a need score range of 123.4 to 140.1, followed by mid-career teachers with a mean score of 127.7 and a need score range of 116.2 to 139.2, and late-career teachers with a mean score of 106.4 and a need range of 92.8 to 119.9. It was found that the maximum need score of the late-career teacher and the minimum score of the early-career teachers had a gap of 3.5 points. Due to this gap in need score means, Early-career teachers were found to be statistically different when compared to late-career teachers ($F(3,149) = 74.389$, $p < .05$). Comparing early-career to mid-career and mid-career to late-career showed no statistical difference.

All career phases identified *access to essential resources* and *curriculum resources* in the top five identified needs. The early-career teachers had further overlapping identified need for *work-life balance* being shared with mid-career teachers and *support from local school administration* shared with late-career teachers. A total of nine unique needs items were found as the top five needs regardless of career phase (see Table 4)

Table 4*Identified Needs by Career Phase (n = 121)*

Career Phase	Identified Need	<i>M</i>	<i>SD</i>
Early-career	Work-life balance	3.58	.67
	Access to essential resources	3.57	.53
	Curriculum resources	3.56	.56
	Support from local school administration	3.52	.75
	Classroom/Laboratory support	3.47	.53
Mid-career	Curriculum resources	3.61	.49
	Work-life balance	3.51	.56
	Access to essential resources	3.45	.56
	Purposeful professional development	3.41	.50
	State level support	3.38	.61
Late-career	Support from local school administration	3.54	.62
	Access to essential resources	3.38	.49
	Assistance/resources for training FFA teams	3.30	.53
	Respect	3.30	.79
	Curriculum resources	3.29	.69

Further analysis was warranted to identify the top five needs of the three teaching certifications held by the participants (see Table 5). Traditionally certified teachers were found to have a total need score mean of 125.02 with a range from 90.00 to 168.00 points. Alternatively, certified teachers were found to have a total need core mean of 126.58 with a range from 116.00 to 168.00 points. Emergency certified teachers had a total need score mean of 138.00, ranging from 136.00 to 140.00 points (see Table 5). After analysis of the one-way ANOVA, it was found that differences in total need score means and the certification type held by the participants was not statistically significantly different ($F(1,1) = .540, p > .05$).

Analysis by teacher certification pathway showed all participants addressed their top five needs between *agree* and *strongly agree*. Emergency certified teachers indicated *strongly agree* for their top five identified needs. However, it should be noted that there were only two emergency certified teachers among the participants, indicating both participants strongly agreed (a score of 4 on the instrument) for their top five needs. Two items were found to have been a top five need within all three certification groups i.e., *support from local school administration* and *work-life balance*. An additional two items were found in at least two of the certification groups, i.e., *respect* (alternatively and emergency certified teachers) and *access to essential resources* (alternative and traditionally certified teachers; see Table 5).

Table 5*Identified Needs by Certification Pathway (n = 121)*

Certification Pathway	Identified Need	<i>M</i>	<i>SD</i>
Alternatively Certified	Support from local school administration	3.63	.50
	Their planning period (i.e., not being required to cover other classes/duties)	3.54	.52
	Respect	3.54	.52
	Work-life balance	3.54	.52
	Access to essential resources ^A	3.45	.52
Emergency Certified	Community support	4.00	.00
	Parent support	4.00	.00
	Support from local school administration	4.00	.00
	Respect	4.00	.00
	Work-life balance	4.00	.00
Traditionally Certified	Curriculum resources	3.51	.55
	Access to essential resources	3.50	.52
	Work-life balance	3.46	.64
	Support from local school administration	3.45	.72
	Assistance/resources for training FFA teams	3.34	.63

Note. Alternatively certified teachers were teachers who previously held a college degree and passed the Oklahoma agricultural education teaching examination. Emergency certified teachers were self-identified to have been emergency certified based upon Oklahoma department of education standards. Traditionally certified teachers were teachers who attended an institution(s) that prepared agricultural education teacher educators and successfully met all requirements for degree completion and teacher certification in agricultural education. ^AAlternatively certified participants identified eight needs with the same need score mean and standard deviation. The fifth item listed in table 5 is the first identified in instrument order, followed by *parent support*, *classroom/laboratory support*, *support in providing equal opportunities to all students*, *agricultural mechanics skills*, *resources for awarding and recognizing SAEs*, *resources to help students overcome various levels of public speaking anxiety* and *assistance/resource to develop FFA officer teams*.

The five regions represent the Oklahoma FFA association and are identified by their geographical location within the state. Region I had 32 responses to the instrument with a total need score mean of 126.50, while Region II had 43 responses and a total need score mean of 126.60, Region III with 11 responses and a total need score mean of 118.08, Region IV with 22 responses and a total need score mean of 133.91, and Region V with 13 responses with a total need score mean of 137.77, respectively. After analysis of the regional total need score means and performing a one-way ANOVA test, it was found that the regional total mean need scores were not statistically significantly different between the regions ($F(2,2) = 5.405$ $p > .05$).

Four items (i.e., *access to essential resources*, *curriculum resources*, *support from local school administration*, and *work-life balance*) were found to have been identified as a top five need in at least four of the regions. Three items (i.e., *respect*, *community support*, and *accessibility training*) were found to have been identified as a top five need in two of the regions. Nineteen unique items were found as a top five need item in at least one Oklahoma region (see Table 6).

Table 6*Identified Needs by Region of Oklahoma (n = 121)*

Region of Oklahoma	Identified Need	<i>M</i>	<i>SD</i>
Region I	Curriculum resources	3.71	.45
	Access to essential resources	3.56	.50
	Parent support	3.53	.71
	Support from local school administration	3.46	.76
	State level support	3.43	.71
Region II	Access to essential resources	3.46	.50
	Work-life balance	3.45	.67
	Support from local school administration	3.41	.73
	Respect	3.38	.62
	Purposeful professional development	3.37	.57
Region III	Work-life balance	3.45	.68
	Support from local school administration	3.36	.67
	Access to essential resources	3.27	.46
	Respect	3.27	.90
	Community Support ^A	3.18	.40
Region IV	Support from local school administration	3.81	.39
	Curriculum resources	3.66	.48
	Access to essential resources	3.63	.49
	Work-life balance	3.63	.58
	Community support	3.61	.49
Region V	Classroom/Laboratory support	3.53	.51
	Work-life balance	3.53	.51
	Tools to address student mental health issues	3.53	.51
	FFA support	3.46	.51
	Skills and techniques for working with students with special needs ^B	3.46	.51

Note. ^ARegion III participants had seven items identified with the same need score mean. The fifth item listed in the table above had the lowest standard deviation, followed by 1. *their planning period (i.e., not being required to cover other classes/duties)*, 2. *curriculum resources*, 3. *agricultural content knowledge*, 4. *resources to help students overcome various levels of public speaking anxiety*, 5. *assistance/resource to develop FFA officer teams*, and 6. *assistance/resource for training FFA teams*. ^BRegion V participants had three items with the same need score mean and standard deviation. The fifth item listed in table 6 is the first identified in instrument order followed by 1. *accessibility training* and 2. *curriculum resources*.

Conclusions, Implications, and Recommendations

Twenty-nine of the 42 items achieved a mean indicating a high need (i.e., mean score above 3.1) for SBAE teachers in Oklahoma, the remaining 13 items resulted in a moderate need. The top two items included *access to essential resources*, and *curriculum resources*, aligning to an ongoing need for content, curriculum, and practical resources to support their programs (Doss et al., 2022). The needs identified by SBAE teachers also reflect the importance of relationships with parents, administration, community, and state-level supporters in the surrounding school community to provide resources and meet program needs (Marsh, 2022; Doss et al., 2022). In addition, items such as *support from local school administration*, *work-life balance*, and *respect* represent the human need to establish relationships, boundaries, and a level of respect within their professional role as SBAE teachers (Marsh, 2022; Shoulders et al., 2021). Perhaps to better address the subsistent and security needs (Marsh, 2022) of current Oklahoma SBAE teachers, a more effective lens is necessary to create actionable change?

A statistically significant difference was found in SBAE teacher's self-reported need scores based on personal and professional characteristics of participants ($F(3,149) = 74.389, p < .05$). Early-career SBAE teachers participants corresponded with a higher percentage of female SBAE teachers in the Oklahoma, which represents the population of participants with higher self-reported need scores. While this finding was statistically significant, it also speaks to the practical significance of developing professional development training, curriculum resources, and instructional tools that meet the individual personal and professional characteristics of Oklahoma SBAE teachers. Further connecting to the need to evaluate teachers through a human lens using the *Conceptual Model of Support for SBAE Teachers* (Marsh, 2022).

When considering the needs identified by personal and professional characteristic subgroups, males had a grand mean need score lower than female respondents, but males need scores for the top five items were higher than that of the female respondents. This suggests that the top items identified are significant high needs impacting males in the profession. Males differed in the top five responses from females with *respect* replacing *purposeful professional development*. Perhaps this is an impacting factor for males not entering or being retained in the profession because it is no longer aligning with their individual human needs to feel respected within the profession (Marsh, 2022). In addition, female respondents reported a higher grand mean score reflecting their increase in identified needs, which is supported by the fifth item, *purposeful professional development*, as the recognition of future human capital development to support their practice within the profession is essential (Eck et al., 2019; Marsh, 2022).

Early-career teachers were found to have statically significant needs when compared to the needs of late-career teachers by the grand mean score, but they still shared three of the top five needs, including *access to essential resources*, *curriculum resources*, and *support from local school administration*. Traini et al. (2020) concluded that early-career teachers' stress as they strive to achieve stability in their personal and professional career and struggle in silence but the review of identified needs by career phases suggests that they share needs with mid and late-career SBAE teachers. Even with early-career teachers responding with a greater need than that of mid and late-career teachers, perhaps connecting early-career teachers with mid and late-career teachers could improve connectedness and community by sharing resources and fostering mentorships. Mid-career SBAE teachers had the most overlap between early and late-career teachers aligning with Huberman's (1989) *teacher career cycle model* that this is a critical phase for providing engagement, professional development, and resources that are targeted to support their career retention.

Reviewing identified needs by certification pathway, emergency certified teachers responded with a need score mean of 4.0 and a standard deviation of 0.00 for *community support*, *parent support*, *local administration support*, *respect*, and *work-life balance*. The findings align with Mobra and Hamlin (2020) that emergency certified teachers lack the support and resources needed to improve their practice and overcome the barriers to becoming successful in the classroom. Further, the needs identified by emergency and alternately certified teachers are relational focus suggesting a need for belonging within the profession through community, mentorship, and networking (Marsh, 2022). Interestingly, traditionally certified teachers identified as needing resources and training FFA teams which may be a product of their own FFA interests, self-efficacy in pedagogy, or interest in engaging and improving leadership teams and events.

The regions of the State had similarly identified the top five needs for *access to essential resources*, *curriculum resources*, *support from local school administration*, and *work-life balance*, which is also reflected by the overall top five identified items suggesting that the regional and state identified needs align and that no region has a significant gap of resources. This is further confirmed by the statistical power of the study 0.99, and the lack of significant differences between regions ($F(2,2) = 5.405 p > .05$). Unique to region V was the identified need for *skills and techniques for working with students with special needs*, which may represent a specific gap between schools and school districts within the region.

Practical recommendations from this study include targeting the resource, curriculum, and professional development needs of SBAE teachers based on their unique personal and professional characteristics due to the differences found between female and male respondents as well as between early-career and mid to late-career teachers. It is recommended that instructional tools and curriculum resources be organized in an easy to access format and provide a structured plan for ease of implementation for SBAE teachers. Many of the identified needs overlap between different personal and professional characteristics which provides the opportunity for mentorship/community development between early, mid, and late-career teachers as well as alternative/emergency certified participants with traditional certified participants. Specifically identified needs as in region V's *skills and techniques for working with students with special needs* and late-career teacher's *assistance/resources for training FFA teams*, should be addressed through professional development, communication of tools available, and updated resources targeted specifically to the participants' needs.

Additionally, professional development opportunities should focus on furthering the human capital of the complete person for SBAE teachers in Oklahoma. *Respect* and *work-life balance* represent basic human needs found at the subsistence, security, and belonging level at *the conceptual model of support for SBAE* (Marsh, 2022). Efforts should be made to build relationships, the sharing of resources and fostering mentorship between the career phases could help to bridge the identified need gap and increase security in the profession since one-size fits all is not effective for creating the human capital growth needed to overcome the current identified needs (Marsh, 2022; Doss et al., 2022; Klassen & Chiu, 2010; Shoulders et al., 2021). As well as providing SBAE teachers the resources needed to advocate and defend the value of their programs and communicate with parents, administration, and the surrounding community to increase sense of respect and appreciation.

Future research should further investigate the impact of such professional development, including alternatives to one-time professional development workshops. Furthermore, the perceived expectations of SBAE teachers from superintendents and school administrators should be evaluated to potentially address the value, respect, and workload of Oklahoma SBAE teachers. Validation of the conceptual model of support for SBAE should be evaluated as a tool for identifying SBAE teachers' unique needs and connecting them with actionable resources.

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Assessment of Agronomy Extension Education on Farmers' Empowerment Towards Food Production in Rural Uganda

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The government of Uganda has over the years adopted different extension approaches to building farmers' capacities, however, limited extension agents always hampered its progress necessitating partnerships with organizations. This study assessed progress made by the Center for Sustainable Rural Livelihoods as a case study in building farmers' capacities in agronomy practices. We surveyed 454 households, of whom 48.2% had trained in agronomy between the 2014-2018 assessment period. The majority (58.4%) trained in seven modules considered in this study including soils, composting, land-use planning, agronomical practices, micronutrient gardening, postharvest, and marketing. By frequency of training, 55.7% trained between 1-7 of 21 maximum rounds, we found a higher average score of 84.7% in knowledge comprehension and retention. In application, trainees engaged most in micronutrient gardens (sack, keyhole, and kitchen gardens), used tarpaulins while drying crops, and had harvest reserves for food security. On changes in crop production, we established a general decrease in households' engagement in production for all seven crops traced in this study including amaranths, soybeans, millet, maize, beans, potatoes, and cassava. Most changes in livelihoods were attributed to food production especially cassava, potatoes, and beans. Income was mostly linked to sales from maize, millet, and beans. We recommend improvements in field monitoring to encourage participation in training and the adoption of agronomical practices.

Introduction and Background

Agriculture is the backbone of Uganda's economy, feeding the population with food supplied, and is the foundation of the country's agro-based industrial development efforts. Over 50% of the agricultural activities practiced by farmers are on small-scale characterized by low output, which is mainly for home consumption and any surplus is for sale (UBOS, 2016). Over-reliance on nature with its dire consequences like drought, infertility, and floods partially explains the low yield. This situation partially accounts for the high levels of food insecurity and malnutrition and the prediction of the "current path scenario", indicates that Uganda may not achieve food security by 2050 (Hedden et al., 2018). These revelations suggest a need for more approaches in capacity building for behavioral changes in agrifood production systems.

The government of Uganda has over the years adopted different extension approaches chronologically aimed at building the capacity of the farmers. During the pre-independence period, extension delivery was characterized by an authoritarian system, executed by cultural chiefs on behalf of the British colonial masters for their interests in cotton and coffee production for their industries (Semana, 1999). In the 1950s towards the eve of independence and after independence, a "Transfer of Technology" (ToT) model was adopted. In this model few trained extensionists were identified by the governing authorities; trained communities on demonstration farms after which trained farmers went on to practice the learned lessons (Opio-Odongo, 1992). The ToT system was also authoritative, and farmers had no contribution to knowledge transfer, it was bureaucratic, and lacked accountability (Ssemakula & Mutimba, 2011). Lack of interactive

communication between researchers and end users of technology and poverty (Pound & Conroy, 2017); and also differences in receiving environments from those where technologies were developed increased the failure rates of ToT in many countries (Chambers, 1997).

In Uganda, the “Transfer of Technology” (ToT) model was further devastated by the political turmoil characterized by the military governments of 1970-1985 (Museveni, 2000). This period ushered the Bretton Woods institutions; the World Bank (WB) and International Monetary Fund (IMF) that introduced the Structural Adjustment Policies (SAPs), which were resolutions by the WB and IMF to help developing countries out of poverty (Kreimer et al., 2000). The “Training and Visit” (T&V) approach was adopted as a new extension model in 1992 with the support of the WB after adhering to the SAPs (Anderson et al., 2006). This model involved extension agents training specific farmers and a follow-up was conducted. However, the model was never effective due to a lack of enough extension staff, and the concentration on large farmers as compared to small-scale farmers. Feder et al. (1986) analyzed this T&V model in India and also found the same results, although, in India, technological advancements influenced further growth of the T&V to benefit more farmers.

Although Uganda was among the first best performers in reforming its economy owing to the SAPs’ first five years, by 1996 it was listed among the “Highly Indebted Poor Countries” [HIPCs] (Kreimer et al., 2000). As a condition for debt waiver from the World Bank, the HIPCs were asked to formulate “Poverty Reduction Strategy Papers” to cover a period of 20 years [i.e., 1997-2017]. Uganda drafted her “Poverty Eradication Action Plan” (PEAP) targeting a 10% decrease in absolute poverty (MFPED, 2000). Embedded within the PEAP for agricultural development was the “Plan for Modernization of Agriculture” (PMA) whose goal was to eradicate poverty by transforming subsistence agriculture into commercial agriculture. A new secretariat called the National Agriculture Advisory Services (NAADS) was formed to implement the activities of the PMA (MAAIF, 2000). The “farmer-to-farmer” extension approach was adopted. This approach worked in a decentralized governance format where farmer groups were formed at the village through Sub-counties to District levels. The implementation model was demand-driven, based on the community’s needs; the communities were involved in a participatory manner to find solutions to their problem. Financing the NAADS activities was through crowdfunding from multiple stakeholders including the government, donors, NGOs, and local farmers in a form of cost-sharing.

During the launching of the “farmer-to-farmer” extension model, the Uganda Nutrition and Food Council (UNFC) indicated a limited number of extension agents as a problem in the capacity-building efforts (MAAIF & MoH, 2004). Since then in 2003, the Ministers of Health and Agriculture appealed to the general public including the NGOs and government organs to pass the UNFC’s policy framework named Uganda Food and Nutrition Strategy (UFNS). Upon passage of the UFNS, its investment strategic plan was drafted. The line Ministries including Local Government, Health, Agriculture, Gender, Land, Justice, Finance, and The Office of the Prime Minister committed full support to its implementation with the stakeholders (MAAIF & MoH, 2004). This process accounted for the private-public partnership ushered in by Iowa State University through its Center for Sustainable Rural Livelihoods since 2004 to uplift the status of rural communities in Uganda through capacity building with funding from private donors (Butler & McMillan, 2015; Ikendi & Retallick, 2023a; 2023b).

The Center for Sustainable Rural Livelihoods (CSRL)

The CSRL envisions the development of “responsible global citizens and thriving local communities that benefit from food and financial security, ...” (CSRL, 2020, p. 2; Ikendi & Retallick, 2023a). This vision is achieved through a public-private partnership where it operates in a trio partnership with Makerere University Kampala (MAK), and the local NGOs. Between 2004 to 2014, the local participating NGO was Volunteer Efforts for Development Concerns; this trio operated under the “farmer-to-farmer” model (Masinde et al., 2015) commensurate with the government model under the NAADS program. Farmers were organized in small groups, formed constitutions, and elected leaders (Seguya et al., 2015). The groups worked with both the government and CSRL extensionists in capacity building to improve food production. In 2014, Iowa State University Uganda Program (ISU-UP) assumed the role of the local participating NGO (Butler & Acker, 2015). In operationalizing the ISU-UP, the CSRL instituted its new model of operations called the Comprehensive Life-Span Approach to Capacity Development (CSRL, 2017 as described in Ikendi, 2019, pp. 47-64). In this approach, CSRL/ISU-UP touches the lives of all community members, from pregnancy to seniors, through different livelihood programs while concurrently building their capacities. Although the program has several livelihood projects, this paper focuses on agronomy and postharvest programs. The agronomy program aims to improve access to extension knowledge and quality diverse crop inputs to ensure food and financial security and reduce malnutrition.

Depending on the available funds, the CSRL/ISU-UP program provides some trained clients with planting seeds like millet, soybean, grain amaranths, high iron beans, maize; seedlings of collards, eggplants, spinach, onions; vines of orange-fleshed sweet potatoes; cassava cuttings, banana suckers, among other crops. Providing inputs is aimed at ensuring that farmers’ gardens have nutrient-dense crops to diversify their diets, and incomes from sales, and ensure sustainability in production through seed multiplication. For sustainability, farmers are obliged to return to the program the equivalence of the seed given to them after harvesting so that new farmers can get the seeds as well. The farmers in the community irrespective of their affiliation to the program also receive agronomic training to ensure they attain the knowledge required to be applied in the fields for proper field crop management to attain high crop yield. In the postharvest program, the CSRL/ISU-UP goal is to reduce postharvest losses at schools and communities to enhance food security. The program looks for ways of reducing pest infestation, losses due to spillage, eliminating molding, and extending the shelf life of stored grains. Farmers affiliated with the postharvest program in addition to training, receive hermetic silos and tarpaulins at subsidized prices by the program. Farmers also, have access to the grain cleaning machines from the program to ensure that grains are clean before they are stored to increase their shelf life and/or sold for a premium price in the future.

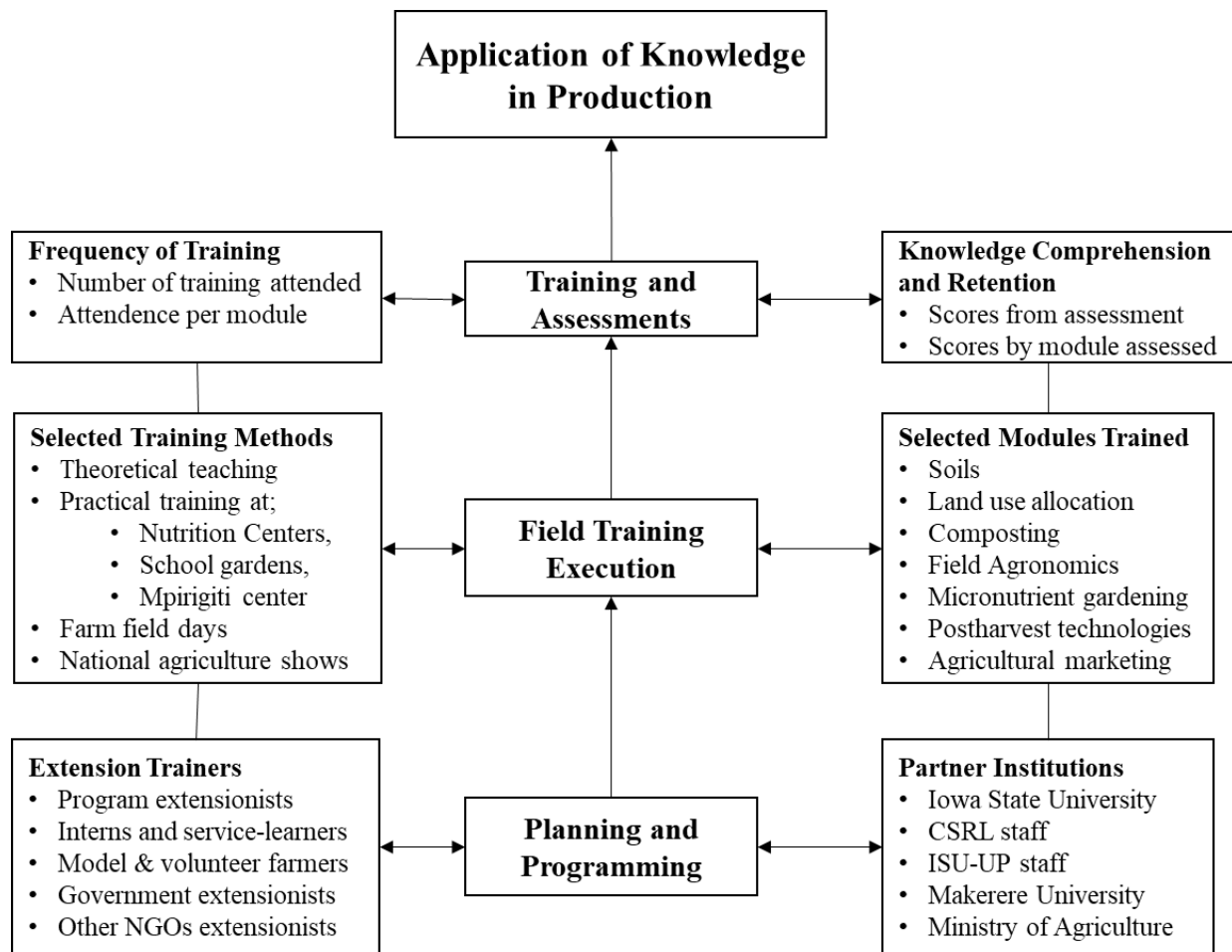
Theoretical and Operational Frameworks

This study was grounded in the theory of planned behavior (Ajzen, 1985) which evolved after the theory of reasoned action (Fishbein & Ajzen, 1975). The theory supposes that when we plan to do something, then we do it. The theory was built on three intentions i.e., behavior attitude, subjective norm, and perceived behavioral control. The behavior attitude ascribes to how we think and feel about behavior which relates to two concepts – affective attitude describing a belief about the attitude (behavior to be enjoyable or not); and instrumental attitude – belief about the attitude (behavior whether beneficial or harmful). The subjective norms relate

to the support given significantly by others e.g. family and friends; and it has two concepts i.e., the injunctive norms (do others encourage you to do the behavior?) and the descriptive norms (do others in the group engage in the same behavior or not?). The perceived behavioral control relates to the feeling capable and confident to do a behavior which requires that there must be capability and intention to overcome barriers and challenges. In sum, when all three intentions are fulfilled, we feel strong and more likely to engage in the behavior. The theory of planned behavior (Ajzen, 1985) infuses into the operations of the agronomy and postharvest programs of this study. The capacity-building training is organized within communities responding to the needs expressed by the small-landholder farmers either directly through extension and outreach coordinators or through the programs' rapid assessments, and/or based on research findings. The CSRL/ISU-UP agronomy and postharvest program follow a systematic process in their training exercises as illustrated in Figure 1 drafted by the authors for purposes of guiding this research; and also a signification of the public-private partnership.

Figure 1

CSRL/ISU-UP Agronomy and Postharvest Assessment Framework



The capacity-building and training process starts with the planning phase which involves programming and finding resources to empower the Extension and Outreach Coordinators in conducting the different capacity-building programs. There are two components in the planning

phase including the extensionists who conduct the training and the partner institutions. What guides programming are the core values of understanding the community customs. Among the extension trainers, in addition to the program Extension and Outreach Coordinators, there is a pool of additional trainers notably the interns and service-learning students. These students work with communities reciprocally learning from each other through farm field visits and accomplishing various bi-national team projects aimed at identifying and solving community problems with appropriate technologies (Ikendi, 2022a; 2022b; Ikendi et al., 2022; 2023). Having model farmers and volunteers as part of extension educators means the co-creation of knowledge with the community, an important aspect in adult learning as a motivation to participate (Schunk, 2020). The farmers and volunteers in the training are an element that suits the different aspects of the theory of planned behavior (Ajzen, 1985) as earlier described.

Working with the indigenous knowledge of farmers (Masinde & McMillan, 2015), and being guided by scientific research (Acker et al., 2015) helps in aligning training and innovations for the farmers. The extensionists capitalize on the scientific research findings to compose the teaching material and disseminate it within the local environment from where the research was conducted. Specific examples in this respect are the findings of Muyonga et al. (2011) which guided training in grain amaranths production; Bbosa et al. (2017; 2020) on storage pest management; Tusiime et al. (2019) on the tomato value chain; Kwikiiriza (2022) on pumpkin production; Akitwine (2021), and Wokibula and Westgate (2016) on soils management; and Mayanja et al. (2018) and Sserunjoji (2020) on storage grain quality. This process reinforces the land-grant ethos abroad (Ikendi & Retallick, 2023a; 2023b).

The blend of extensionists including program staff, service-learners, and partners from the government and NGOs depict a public-private collaboration described in the CSRL/ISU-UP's tapping philanthropy to improve rural livelihoods (Butler & McMillan, 2015; Ikendi & Retallick, 2023a). The success of outreach is dependent on the capacity of the facilitators, their relationships with the learners (Morrone, 2017), and collaborations in the co-creation of the learning materials (Schunk, 2020). Among partner institutions, there is a collaboration between universities and government institutions and ministries. Each partner provides either human resources, for instance, service-learners from universities or Extension and Outreach coordinators; and/or findings of scientific research to guide the programming of training materials and how to induce the transfer of technologies (Ikendi, 2022a; 2022b).

In the execution of the training program, educators blend the modules they use to train based on the needs and the season of the farm calendar and the methods of training that best relay the messages to the farmers. The variety of modules trained including soils, composting, land use planning, micronutrient vegetable gardening, agronomical practices, postharvest, and marketing practices allows the farmers to choose what to learn that suits their aspirations as they learn from a variety of facilitators. These modules are trained for farmers in a sequence from land preparation and mapping through planting and postharvest management of the harvest to increase shelf life and marketability tailored across the seasons. Both theoretical and practical training is conducted at the Mpirigiti Rural Training Center – the home of CSRL/ISU-UP (CSRL, 2018; Ikendi & Retallick, 2023a), at the Nutrition Education Centers [NECs] (Ikendi, 2019, pp. 55–64), school gardens – a component of service-learning in schools supported by the program, farm field days, and at the National Agricultural Show every July of the year (Ikendi, 2022a; 2022b; Ikendi et al., 2023). During learning, educators need to assess their learners by asking questions and/or practical demos led by learners to demonstrate learning efficiency.

The overall outcome of the extension education is the application of lessons learned through implementing what has been taught in the different modules both in agronomy and postharvest technologies. Applying knowledge learned based on scientific research and within the local and national environment is a move towards ensuring high output. The application of lessons in their fields is accompanied by field monitoring of activities done by the Extension and Outreach Coordinators for additional guidance to have more knowledge comprehension and retention which requires continuous learning. In the “2050 time capsule” (CRSL, 2018, pp. ii; Ikendi & Retallick, 2023a), the ISU President implored the people of Kamuli to end hunger but never to stop hungering for knowledge. This message motivates the community to keep attending the training as called on to keep up with the technology and innovations in cropping systems.

Linkages of the Theoretical and Operational Frameworks to the Literature

This theoretical piece demonstrates how extensionists go about their training bearing in mind the principles of adult education to enhance learning and motivation for high knowledge comprehension, retention, and application in production. The theoretical training component, for instance, helps adult learners internalize the facts of the module being taught; and the practical section through demonstrations helps to conceptualize the theory into practice in an experiential learning manner. Adult learners require more hands-on training sessions because they find it easier to learn concepts as they are being demonstrated (Schunk, 2020). Similarly, they find relevance when engaged in task-oriented learning activities to provide them an opportunity to connect the learning to real-world experiences because of their familiarity with the problem.

To engage adult learners and have an active and interactive learning process, educators adopt different learning methods and integrate them into the lesson plans to create lessons that combine intelligence for meaningful learning experiences (Gardener, 2011; Schunk, 2020). Gardener’s (2011) Theory of Multiple Intelligences recognizes that most people have more than one area of intelligence. Having different learning methods allows the learners to participate in the creation of knowledge with a recognition that learning is a process, and learners need to use their experiences, thoughts, beliefs, and feelings to construct meaning (Schunk, 2020). This aspect is also paramount in adult learning as a motivation to learn through recognition of their contribution to the learning process. In influencing behavioral changes through capacity-building programs, educators serve as guides; they are catalysts who cause change but are not part of it and without necessarily pushing the community to adapt to a new change (Rogers, 2003). This study looks forward to assessing these changes in training and application.

Purpose and Objectives of the Study

The purpose of this study was to assess the dimensions of household participation in agronomy and postharvest capacity building and training programs and their impact on farm operations and livelihoods. There were three specific objectives which included to:

- 1) Determine the frequency of household participation in agronomy and postharvest capacity building and training programs.
- 2) Assess the quality of household participation in agronomy and postharvest capacity building and training programs.
- 3) Compare and establish the changes in household engagement in crop production across seasons between the trained and on-trained households.
- 4) Find out the changes in household livelihoods attributed to specific crops grown by the farmers.

Methods and Design

This study was part of a larger study that assessed the impact of participation in livelihood programs on household food and nutrition security in the rural Kamuli District, Uganda (Ikendi, 2019). This study was commensurate with the CSRL/ISU-UP general evaluation to assess the impact of the 2014-2019 strategic plan. We gathered data from households in the Butansi and Namasagali Sub-counties of Kamuli district, Uganda where CSRL/ISU-UP works to end global hunger through capacity-building livelihoods programs. Approval to conduct this study was obtained from the Institutional Review Board at ISU under IRB #18-356-01. The study was a cross-sectional survey that involved collecting data from purposively selected clients of the Nutrition Education Clients (NECs) who had participated in the agronomy and postharvest capacity building and training programs. NECs are community-based satellite centers where at-risk malnutrition mothers and children of 0-59 months of age are rehabilitated through nutritional therapy (Ikendi, 2019).

A total of 1,503 clients had been served by the NECs between 2014-2018, all clients were eligible participants. We established a representative sample of 306 participants at a 95% confidential interval with a 5% margin of error. The list of clients was obtained from the CSRL/ISU-UP office in Kamuli, Uganda. During data collection, the NECs' Community-based trainers led the team of trained research assistants and the Co-PI to the target households. Only clients above 18 years and who provided verbal consent were interviewed. The survey tool was written in English, but the questions were all asked in the local "Lusoga" dialect, the native language of the Co-PI and mostly spoken by the research assistants and the community trainers. A total of 219 (71.6%) households who had participated in the agronomy and postharvest programs were accessed and interviewed. We intended to run a comparison of the application of agronomy and postharvest technologies between trained and non-trained households. To achieve this, we interviewed additional 235 non-trained households within a quarter-mile radius of an interviewed trained household, giving an overall of 454 households.

Data Collection and Analysis

We collected and analyzed data on the four objectives. Objective one focused on determining the quantity (frequency) of participation in agronomy and postharvest extension education. The first part of objective one established the number of training modules that a household member participated in. There were seven modules considered in this study including manure composting; land use mapping and planning; soils and soil improvement; grain storage and postharvest technologies; marketing; micronutrient vegetable gardening (i.e., kitchen, sack, and keyhole); and field agronomical practices (i.e., sowing, nursery, and seedbed preparation). The question was "Yes" and "No" asking if a household participated in a specific module. In part two of objective one, we assessed the frequency of participation in the training. We asked participants to estimate the number of times they attended every module in part one from 2014 through 2018. We categorized the estimated number of times attended as "1" for responses of less than 5 times, "2" for 5-10, and "3" for >10 times of participation in the training of a particular module. In analysis, we summed up the categories to generate a minimum of 7 times and a maximum of 21 equating it to modules since estimates were based on modules. Secondly, we generated a three-tier cluster to represent the overall rate of participation in the agronomy and postharvest programs where: "1" represents fair participation of 1-7 times, "2" for good participation of 8-14 times, and "3" for very good participation of 15-21 times.

In objective two, we assessed the quality of agronomy and postharvest training with six questions that required short responses to ascertain the level of comprehension and knowledge retention after long-term training. The research team developed the questions based on the training in each module, for instance, how do you make compost manure? The questions were then discussed with the program agronomy extensionists for accuracy. The research team and the extensionists agreed on the “relative right answers” which were used as a grade book during data entry. Only one point was earned for each “correct answer” and zero for the “seemingly wrong”. A minimum of zero and a maximum of six points were earned. We generated 3 clusters of points with 0-2 points “below average”, 3 points “average”, and 4-6 points “above average”. We generated frequencies and percentages to measure the central tendency by modules and categories. We also employed an ANOVA at a .05 level of significance to explore the differences in the frequency of attendance and knowledge comprehension. We further employed a Chi-square analysis to examine the relationship between the trained and non-trained in the application of lessons to determine the direction of our conclusions on the significance.

In the third objective, we established the percentage changes among households in comparatively growing a specific crop between trained and non-trained households. Seven crop varieties commonly grown including grain amaranth, millet, soybean, beans, maize, cassava, and sweet potatoes were considered for the period 2014-2018. The year 2014 was used as a “baseline” when ISU-UP was operationalized as a partner of the CSRL under the capacity-building model of extension education (Ikendi & Retallick, 2023a). The year 2017 was used as a “reference” since it was relatively in the middle of the CSRL/ISU-UP strategic plan of 2014/2019 that was under investigation for its impacts on the community. The year 2018 was used as the “endline” as it had the latest crop yield data at the end of the strategic plan. We traced if the households produced the same seven crops in 2014, 2017, and 2018. We hoped that with the extension education program activities, there would be stimulation of production and continuity. Also, even non-program affiliates could join the production because of social capital which could involve sharing knowledge and even seeds as a community.

In objective four, we investigated the changes in the household livelihoods attached to producing a specific crop. We emphasized three livelihood indicators including income, food supply, and area cultivated using season one (i.e., from March–July) of 2017 as our reference. We chose the 2017 main season as opposed to 2018 because, 2018 is when data was collected and output had not all been sold off, so it could not give a relative impact on income. Income was calculated as the percentage of output sold, the percentage of households sold, and total and average income from sales. Food supplies were a function of total output minus total sold to get the household food reserves. Land area cultivated was a function of the total area divided by the number of households to get an average acreage cultivated per crop. We generated percentages from the results on every crop for each indicator. This indicator is vital in planning the training program and seed aid supplies to match the community’s demand and desire for a crop.

Results and Discussions

Participation in Agronomy and Postharvest Extension Education Programs

Of the 219 households who participated in the training program, 128(58.4%) trained in all the seven modules considered in this study and 91(41.6%) spread their training between 1-6 modules. Details on module assessment by frequency of the training are shown in Table 1.

Table 1*Percentage of Participation in Agronomy and Postharvest Training Modules (n=219).*

Modules Trained in Agronomy and Postharvest	Frequency	Percentage
Micronutrient Vegetable Gardening	206	94.1
Field Agronomical Practices	197	90.0
Soil Types and Soil Improvements	187	85.4
Grain Storage and Postharvest Practices	187	85.4
Manure Composting	182	83.1
Land Use Mapping and Planning	163	74.4
Marketing and Gross Margin Analysis	163	74.4

The overall participation in the agronomy and postharvest extension training was high with 94.1% in micronutrient gardens and the lowest of 74.4% in land use planning and marketing. Nevertheless, there was a generally high rate of enthusiasm to learn by the households. This enthusiasm gives hope given the fact that Uganda's population is youthful, with low formal education, such extension education helps to build their competencies in agriculture to manage agricultural enterprises (Ikendi, 2019; Lamm et al., 2021; Martin, 2018). In each module the farmers get different ideas, once internalized and practiced, they become better at making decisions that impact farm production. A description of some of the modules and their importance in agricultural production are as follows.

Soil types and soil improvements

Soil types have got a profound impact on both quality and fertility soils making them important aspects of continuous education in crop production. In South-Central Uganda for instance, black and black stony soils have higher soil quality (on indices of acidity or alkalinity and cation exchange capacity) and fertility (on indices of phosphorus, calcium, and base saturation) as compared to red soils (Apanovich & Lenssen, 2018). Farmers in Kamuli perceived soil health as a great indicator of crop growth and yield index (Lege, 2020). This perception was great but there is still a challenge of low yield, for instance, a 213.8lb (97.2kgs) per acre in soybean was established in this study (details in forthcoming section). However, research institutions like Makerere University Centre for Soybean Improvement and Development (MAKCSID) have interested in capacity building among farmers to improve the production, consumption, and marketing of soybeans in many districts including Kamuli (Tukamuhabwa et al., 2019). This collaboration is important to help in the design of extension materials that can be adopted by extensionists and also a depiction of public-private partnership which is the model of operation of the program (Butler & McMillan, 2015; Ikendi & Retallick, 2023a; 2023b).

Manure composting

Farmers need proper education on how to improve soil productivity using ecologically sustainable methods such as compost manure. This manure enriches both soil volume and the crop with nutrients (Edwards & Araya, 2011; Wokibula & Westgate, 2016). Further, farmers need to continuously be taught how to love their soils and reconnect back to the ecological community (Ikendi, 2022c). Manipulation of soils using methods such as synthetic fertilizers can work for some time but are not sustainable with low incomes from crop sales. Studies in beans, for instance, have indicated that soil condition in addition to bean genotype determines the number of bean pods which is a yield index (Okii et al., 2019). However, the application of synthetic fertilizers did not increase bean yields of NABE4, a common bean in Central Uganda

(Goettsch et al., 2016). Similarly, no variations were found in soil quality and fertility with the use of fertilizers in South-central Uganda (Apanovich & Lenssen, 2018). These revelations reveal the need for continuous education on the types of soil and soil amendment practices.

Micronutrient vegetable gardening

The sack, keyhole, and kitchen gardens are land-sparing techniques of production. In these gardens, vegetables like cowpeas, collards, onions, tomatoes, spinach, eggplants, and leafy amaranths are grown. We found that most trainees (55.3%) had at least one of these gardens around their compounds as compared to the 11.9% who possessed them but never trained. These gardens provide households with vegetables which helps to reduce the cost of buying from the market. Although the overall number of households with these gardens was low i.e., 122 kitchens, 24 sack, and 19 keyhole gardens, the majority i.e., 100, 22, and 15 respectively were for trainees. Our findings match with earlier results of Masinde and McMillan (2015) who concluded that seven years after the introduction of kitchen and sack gardens in the program, farmers had abandoned the technology. In other studies within this same sample households who were found with these micronutrient vegetable gardens were likely to be food secure, had a better acceptable caloric intake, and were less likely to have malnourished children (Ikendi, 2019). The reduction in the adoption of such technology speaks to the need for continued monitoring and evaluation of the extension programs.

In the education programs of the CSRL/ISU-UP, sack gardens are promoted in schools as a component of the school garden and service-learning program among students to practice at their homes as a source of food and income (Duerfeldt et al., 2016; Ikendi, 2022a; 2022b). In climate change studies, keyhole gardens are considered an adaptation strategy to climate mitigation for their capacity to hold water for a long period during the dry season (Fadairo et al., 2019). Similarly, vertical sack gardens have been adopted as a way of greening the world (Akinsemolu, 2020). In urban areas with dense populations, households have adopted sack gardens to grow vegetables like in the Kibera slum in Kenya (Gallaher et al., 2015).

Grain storage and postharvest practices

Stressing the significance of recommended postharvest practices among farmers is important especially when the studies are conducted in the same communities and results are relayed back through extension engagement to the farmers. In Kamuli district, different studies show that the postharvest losses in grains like maize were found to be higher (Tibagonzeka et al., 2018) and were also found with higher aflatoxins and molds (Akumu et al., 2020). Akumu et al. further found that drying on bare ground and storage in polypropene bags caused higher postharvest losses in Kamuli district. These findings guide the planning of postharvest extension materials in conjunction with other studies that provide solutions to identified problems. Bbosa et al. (2017) recommended the adoption of hermetic silos to control the maize weevil, a major problem among smallholder farmers. Similarly mixing grain amaranths and maize cobs was found effective in the control of the weevils (Bbosa et al., 2020). Grain amaranths are a major ingredient in the therapeutic porridge used at the malnutrition rehabilitation centers in Kamuli (Ikendi, 2019) and maize is a major ingredient in the school lunch program (Byaruhanga, 2016).

In terms of the application of postharvest technologies, trained households reported a 37.9% likelihood of drying their harvest on tarpaulins which helps to keep the quality of harvest from contamination with rubbish, dust, and stones and improves their shelf life as well. But, in general, the majority of the households (71.1%) reported drying on the bare ground. This high

percentage is probably related to the high unit cost of the tarpaulins compared to the total yield and overall income from product sales. Tibagonzeka et al. (2018) found a relatively higher proportion of up to 93.2% of households drying their harvest on the bare ground within the Kyoga region, where Kamuli district is part. These findings together with our findings make a good call for continuous education of farmers on postharvest technologies.

Number of Modules and Frequency of Training in Agronomy and Postharvest Programs

Up to 80.4% of households trained for atleast five of the seven modules considered in this study. By frequency, most of the participants (55.7%) attended between 1-7 of the 21 possible training in this study. Details are summarized in Table 2.

Table 2
Summary of the Range and Number of Modules Trained

Indicator of Training	Measures	Frequency	Percentage
<i>Range of Modules Trained</i>			
05 – 07	Above Average	176	80.4
03 – 04	Average	25	11.4
01 – 02	Below Average	18	8.2
<i>Number of Times Trained</i>			
15 – 21	Very Good	14	6.4
08 – 14	Good	83	37.9
01 – 07	Fair	122	55.7

The number of times trained was a low category for the period 2014 through 2018. Low attendance creates worries given the fact that 67.8 and 75.1 percent of the household heads and spouses respectively in this population spent the utmost seven years in formal education in this same sample ([Blinded], 2019). Adult education in the extension field is ought to be continuous because learning is a continuous process that involves learning and relearning. This process requires the full participation of the learners to engage in reflective processes with educators to enhance their empowerment as advocated by Dewey (1938) and Freire (2018); especially in agronomy and postharvest techniques for better production to contribute to food availability.

Knowledge Comprehension and Retention in Agronomy and Postharvest Training

Six questions were asked to the trained respondents and the question, and the trainees responded well to questions related to harvesting of grain amaranths, drying of crops, and crop rotations. Overall, 84.9% of the trainees responded correctly with expected answers. Specific questions and scores are summarized in Table 3.

Table 3
Knowledge Comprehension and Retention in Agronomy and Postharvest Training (n=219)

Indicator and Measure of the Training	Frequency	Percentage
<i>Questions and Corresponding Number of Correct Responses</i>		
How do you tell that amaranths are ready to harvest?	208	95.0
How do you dry your crops to ensure quality output?	206	94.1
Why do you rotate crops on your farm each season?	198	90.4
When do you prepare land for next season?	189	86.3
How do you make compost manure?	175	79.9

What is the spacing for grain amaranths?	140	63.9
<i>Scores Attained as Categorized</i>		
Above average (4-6 points)	205	93.6
Average (3 points)	08	03.7
Below average (0-2 points)	06	2.7
Total	219	100

Categorically, 93.6% of the participants scored at least four points on a six-point scale, with a mean and standard deviation of 5.43±0.76. We did not find any significant differences in knowledge retention by scores in relation to the number of training respondents participated in. Although we established a high level of knowledge retention, a sign comprehension, we did not account for farmers' own experiences. This is true given the fact that scores were very high yet attendance to training was low. Farmers' continuous agricultural practices account for the knowledge that could have been applied to respond to the questions without necessarily recalling what was taught during the training. Our findings agree with other researchers that indigenous knowledge is key which helps to drive research, innovations, and inventions (Ikendi, 2022c; Ikendi & Retallick, 2023b; Masinde & McMillan, 2015; Morrone, 2017; Rogers, 2003).

Changes in Households' Crop Production

Table 4 shows the results on trends of crop production for selected seven most grown crops among the households. The results reported showing the percentages of households who engaged in production per crop for the main seasons of March-July of; 2014, 2017, and 2018.

Table 4

Percentage Trend in Crop Production in Main Seasons of March-July of; 2014, 2017, and 2018

Crop and Season of production	Not Trained	Trained	Total	p-value
<i>Grain Amaranths</i>				
Season 1 of 2014 (n=72)	59.3	38.4	41.6	0.036
Season 1 of 2017 (n=173)	11.5	66.7	38.1	0.001
Season 1 of 2018 (n=160)	92.6	92.5	92.5	0.670
<i>Soybeans</i>				
Season 1 of 2014 (n=166)	90.2	57.5	68.6	0.001
Season 1 of 2017 (n=242)	34.9	73.1	53.3	0.001
Season 1 of 2018 (n=226)	92.7	93.8	93.4	0.473
<i>Millet</i>				
Season 1 of 2014 (n=87)	50.8	65.1	59.2	0.059
Season 1 of 2017 (n=115)	14.5	37.0	25.3	0.001
Season 1 of 2018 (n=103)	88.2	90.1	89.6	0.498
<i>Maize</i>				
Season 1 of 2014 (n=370)	96.7	98.0	97.4	0.337
Season 1 of 2017 (n=380)	78.3	89.5	83.7	0.001
Season 1 of 2018 (n=362)	94.6	95.9	95.3	0.352
<i>Beans</i>				

Season 1 of 2014 (n=261)	95.3	88.1	91.3	0.024
Season 1 of 2017 (n=274)	52.3	68.9	60.4	0.001
Season 1 of 2018 (n=257)	91.9	95.4	93.8	0.173
<i>Sweet Potatoes</i>				
Season 1 of 2014 (n=244)	98.3	91.4	94.6	0.012
Season 1 of 2017 (n=250)	50.2	60.3	55.1	0.020
Season 1 of 2018 (n=243)	97.5	98.5	98.0	0.454
<i>Cassava</i>				
Season 1 of 2014 (n=168)	82.3	87.3	84.8	0.219
Season 1 of 2017 (n=171)	34.5	41.1	37.7	0.087
Season 1 of 2018 (n=165)	96.3	96.7	96.5	0.608

Source: Survey data

From Table 4 above, we see a general increase in the number of trained households who cultivated both grain amaranth and soybean crops between 2014, 2017, and 2018. Although the non-trained households had a higher likelihood of producing in 2014 than the trained, we can infer that a general increase in production was partly a result of the operations of the CSRL/ISU-UP in promoting crops based on research (Acker et al., 2015; Ikendi & Retallick, 2023b). Grain amaranths, for instance, were introduced in 2005 after understanding that the community was already growing the traditional type of amaranths and that the exotic type would easily be accepted to increase protein uptake (Masinde & McMillan, 2015). This assessment is in line with what Pound and Conroy (2017, p. 371) advocate that innovation be driven by research “cognizant of, and responsive to, the context in which rural families are working”. The partnership with ISU resulted in CSRL/ISU-UP adopting the soybean (Maksoy 3N & 6N) bred by MAKCSID for the farmers to grow for its high yields (Tukamuhabwa et al., 2019).

The cereals like millet and maize, the trend shows that households engaged in production reduced between 2014 and 2017, and it further greatly increased in 2018. Important to the capacity-building programs were the numbers of trained households consistently high. These cereals are important in nutrition programs as the main components of the therapeutic porridge at rehabilitation centers (Ikendi, 2019). In addition to beans, maize is a main component of lunch in schools supported by the program (Byaruhanga, 2016; Ikendi, 2022b). However, cereal production in 2014-2017 could partially have been hampered by the infestation of striga. This parasitic weed is capable of whipping out the whole field (Kanampiu et al., 2018; Murage et al., 2015) which caused an alarm in the program “we need to figure out how to control striga or the gains we’ve made over the last decade will be wasted” (CSRL, 2015, p. 12).

The traditional staple root crops of sweet potatoes and cassava had the highest number of households participating in production throughout the seasons. However, they depict a very low production in 2017 although trained households were likely to engage more in their production. These crops are important for food security (Ikendi, 2019; Seguya et al., 2018). Households who were found engaged in production in 2017 within this same sample were food secure (Ikendi, 2019). Seasonality and rotation could probably be one of the major reasons for low production in 2017 but increased in 2018, especially, cassava, since it relatively takes a long period could be farmers used the land for other crops awaiting the next season.

Changes in Household Livelihoods

We emphasized three livelihood indicators including area cultivated, food supply, and income using season 1, 2017 as a “reference”. The findings indicated that most of the changes were attributed to food supplies (see Table 5) based on the high proportion of reserves than sales. We established that trained households were 52.4% more likely to grow at least five crops. Same households were found to be food secure (Ikendi, 2019). Engagement in crop cultivation is one way of applying the lessons learned in agronomy and postharvest extension training.

Table 5

Household Livelihoods Changes Attributed to Participation in Crop Production in 2017.

Selected Crops Produced in Season One of 2017	Mean Acres	Total Yield (lb)	Percent of Yield Sold	Percent of Yield Reserved	Percent of HH Sold	Total Sales Revenue (\$)	Mean Sales (\$)
Amaranths (<i>n</i> =173)	0.28	6,517	40.9	59.1	35.8	712.9	11.5
Soybeans (<i>n</i> =242)	0.39	20,225	35.8	64.2	29.8	1,271.5	17.7
Millet (<i>n</i> =115)	0.36	15,991	42.3	57.7	14.8	1,027.9	60.5
Maize (<i>n</i> =380)	1.09	444,837	34.6	65.4	46.6	11,278.5	63.7
Cassava (<i>n</i> =171)	0.47	126,898	2.6	97.4	9.4	443.7	27.7
Beans (<i>n</i> =274)	0.43	34,775	19.2	80.8	16.4	1,289.10	28.6
Potatoes (<i>n</i> =250)	0.48	177,491	4.0	96.0	5.6	302.1	21.6

HH=Households; Exchange rate: 1USD=3,400 UGX, adopted from CSRL 2018/19 FY Budget

In food supply, the total yield and proportion of reserves were used as indices. Food reserves were in two categories i.e., food in the garden like sweet potatoes and cassava, and food in-store, especially grains. Local food security crops (i.e., potatoes, beans, cassava, and maize) had a higher proportion of food reserves than the nutrition security crops (i.e., amaranths, soybeans, and millet). It is common practice for rural farmers to sell off their produce after harvest, however, farmers who reserved food have a higher possibility of being both food and nutritionally secure. These reserves can be eaten in periods of scarcity and/or sold when prices stabilize. Guided by scientific research (Acker et al., 2015; Ikendi & Retallick, 2023b), the introduction of hermetic grain silos in the program was a result of their efficiency in controlling weevils in stored grains (Bbosa et al., 2017). Similarly, to maintain the quality of stored grains, a program service-learner invented and fabricated a pedal-operated grain cleaner which has been adopted by the program for the farmers and schools (Ikendi et al., 2022; Ikendi, 2022a; Ikendi & Retallick, 2023a; 2023b; Mayanja et al., 2018).

In terms of area cultivated, it was established that traditional staple food crops including maize, sweet potatoes, beans, and cassava had at least half an acre of area cultivated. Acreage cultivated is a determinant factor associated with food security (Ikendi, 2019; Sseguya et al., 2018; Malual & Mazur, 2020). The low acreage cultivated can be attributed to land shrinkage in Kamuli over the years from 4.94 acres as average owned in 2004 to 3.54 acres estimated in 2018. Yet, of the 3.54 acres, only 2.45 acres were estimated to be in use on the number of crops, and other cash crops like sugarcane, rice, and livestock farms took the biggest acreages but were not accounted for in this study. Further, out of the 58 households that did not cultivate in 2017, 32.8% had land issues. Similarly, only 32.4% of all respondents accessed hired and/or borrowed land with an average of 1.52 acres which further depicts land issues in the area.

Nevertheless, crops promoted by the CSRL/ISU-UP like grain amaranths, soybean, and millet had less than an acre of area cultivated. These crops are considered for nutrition security where mothers under malnutrition rehabilitation are given seeds for multiplication and the equivalence of the seed given is returned to the program so that new members receive them in the next season. Mothers under rehabilitation are taught how to mix the right proportions of “millet, grain amaranth, soybean, maize, and silverfish” to be milled into nutrient-dense porridge flour to feed the family members (Ikendi, 2019, p. 58). Milk and sugar are added to the porridge at the coking stage to make it tasty and feed themselves and their families.

In the revenue index, other than maize most of the crops promoted by the program for nutrition security like grain amaranths, soybeans, and millet had a higher proportion of sales. These crops including grain amaranths, soybeans, and millet have ready market from the program as they form the main ingredients of the porridge served at the rehabilitation centers. Maize and beans are considered both food crops and cash crops, they have a ready market since they form the main ingredient “Nyoyo”, a meal composed of maize grains and beans cooked together for lunch in schools supported by the program (Byaruhanga, 2016; Ikendi, 2022a; 2022b). Both maize and beans are highly demanded by institutions like Schools, Prison services, and the Army, and for export to neighboring countries of Kenya and South Sudan.

Implications and Recommendations

Stressing the aspect of capacity building in rural communities is important to help households in making informed production decisions. Providing knowledge inform of extension education is an added advantage in addition to the humanitarian aid in form of physical assets. When the knowledge is applied in daily farm activities, there is a likelihood of better production which ensures household food and nutrition security, improved income, and asset acquisition after the sale of produce, improving the overall livelihoods. The emphasis is knowledge transfer, households whose member(s) went through agronomy and postharvest education were likely to apply the techniques and increase their food production. These extension programs help to close that information gap through dissemination and most importantly the integration of indigenous knowledge that experts gain through participatory approaches. A blend of delivery approaches like farm field days, school gardens, Mpirigiti demo center, and agricultural shows give different perspectives to the farmers on the same crop and/or practices which improves their management.

To further help sustain the achievements, the focus needs to be addressed on improving monitoring of the implementation of the learned lessons to put them into practice. Using the CSRL/ISU-UP as a hub of learning the principles of crop and postharvest management is a model of knowledge transfer and empowerment, a move towards sustainability. The agronomical and postharvest skills offered by the program form a stock of knowledge available to every community member regardless of their affiliation with the program. Achieving zero hunger by 2030 as stipulated in the SDG 2015 requires a concerted effort of all sectors both private and government. The ISU president commended the people of Kamuli district in the “2050 Time Capsule” to end hunger but never to stop hunger for knowledge (CSRL, 2018; Ikendi & Retallick, 2023a). Similarly, the continual translation of the Uganda Food and Nutrition Strategy into reality requires all stakeholders. Whereas the program would wish to help more people, the dollar amount dictates the limits of the operational area. This requires the government to fully interest itself in policies and practices that encourage the continuity of the private-public relationship in the fight towards ending global hunger through capacity-building programs.

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Determining the Effectiveness of CASE Professional Development for CASE-certified Agricultural Education Teachers

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Abstract

As professional development can change teacher practice and improve student achievement, the researchers analyzed the traditional Curriculum for Agricultural Science Education (CASE) Institute professional development (PD) program. Researchers used the Garet et al. study which outlined the relationship between the six effective features of professional development and teacher outcome as a framework to analyze the traditional CASE Institute PD courses. Participants who were certified in a traditional CASE Institute PD course were surveyed, and their responses were analyzed using the Statistical Package for the Social Sciences (SPSS) to determine the mean and standard deviation of the data related to the assessment of CASE PD and the assessment of CASE Lead Teachers. These data were used to determine the effectiveness of the CASE PD program. Their responses illustrated the effectiveness of CASE as they had a firm understanding of the material and CASE model, the comfortability of implementing the learned material in their classroom, and the effectiveness of their Lead Teachers based on their teaching abilities. The researchers also concluded that three of the six effective features of professional development examined in this study had a positive relationship between the features of the PD and the participants' responses. From the findings of this study, researchers created a list for recommendations and future research that should occur to further bolster CASE Institute PD courses and curriculum.

Introduction

Agricultural education has been an integral part of the United States' education system since the early 1860's (Advance CTE, 2021). Over the next 100 years, the purpose of agricultural education changed from the preparation for farming as a livelihood to educating all students about the role of agriculture, food, and natural resources (Adelhart, 2006; NAAE, 2021). Along with this shift in purpose, the importance of professional development in education and agricultural education dramatically changed (Frontline Education, 2021).

After the federal government passed the Carl D. Perkins Career and Technical Education Act (Perkins IV) in 2006, the integration of Career and Technical Education (CTE) courses and academics were encouraged (Advance CTE, 2021). As agricultural education falls under the umbrella of CTE, this change in policy initiated the creation of programs that integrated agriculture and other CTE topics into the classroom. The emphasis on CTE in the classroom led to a directive from the National Council of Agricultural Education to create a program that develops agricultural curriculum and professional development (PD) (Lambert et al., 2014). The Curriculum for Agricultural Science Education (CASE) was established out of this directive to provide an enriched curriculum and professional development program that emphasizes school-based agricultural education (SBAE) (Bird & Rice, 2021; Lambert et al., 2014).

CASE curriculum provides a yearlong instructional materials such as daily activities, hands-on projects, laboratory guides, and assessments (CASE, n.d.-a). There are currently 11 different CASE courses including Introduction to Agriscience, Food Science and Safety, Agricultural Business Foundations, and Environmental Science Issues (CASE, n.d.-a). Each CASE course investigates a pathway in agriculture. To access these instructional materials, interested teachers must complete a professional development program in a specific course. For example, if a teacher wanted to be certified to teach Agricultural Business Foundations (ABF), they would need to participate in the CASE Institute professional development for ABF. During this professional development experience, the teacher would go through all of the CASE material, including the activities, labs, projects, and assessments (CASE, n.d.-a). Each CASE course is structured following the CASE Model: curriculum, assessment, certification, and professional development (Carraway et al., 2015). The goal of the CASE model was to establish a nation-wide agriculture curriculum that provides high-level educational experiences for the teachers and students (NC State University, n.d.).

CASE professional development consists of three professional development formats: CASE Institute, BriefCASE, and Fast Track CASE Institute. CASE Institute is the name of the traditional professional development program that focuses on preparing teachers with content based material and pedagogical methods for their agriculture courses through the usage of inquiry-based learning (Smalley et al., 2019). Fast Track and BriefCASE are two other forms of PD in CASE that are more condensed and focused on activities and curriculum knowledge (CASE, n.d.-c). Each CASE Institute is peer-taught by a Lead Teacher. A Lead Teacher has previously taught CASE curriculum in the classroom and has undergone training for their specific CASE Institute. A CASE Institute prepares teachers to use the inquiry-based pedagogy and implement the content into their classrooms (NC State University, n.d.).

CASE research has been conducted to answer a range of research questions related to how CASE influences a teacher's use of inquiry-based methods (Bird & Rice, 2021), the intentions of preservice teachers to integrate science in the classroom using CASE curriculum (Carraway et al., 2015), teachers' experiences implementing CASE (Lambert et al., 2014), interdisciplinary teaching potential with CASE (Pauley et al., 2019), and pre-service teachers' experiences at a CASE Institute (Tummons et al., 2020), which generally show positive use of CASE along with opportunities to enhance the CASE model.

Though there has been extensive CASE research, there is a gap in the literature regarding the effectiveness of CASE Institute as a professional development source for agricultural educators. As CASE Institute provides professional development for many agricultural educators in the United States, there is a need for research examining the professional development component of the CASE model.

Literature Review

Professional development is an important tool in developing effective teachers and improving positive student outcomes because PD equips teachers with knowledge and skills that lead to enhanced student achievement (Mizell, 2010). Student achievement is often measured to determine the success of a secondary school program (Shoulders & Myers, 2014). To improve student achievement and, in turn, the program, professional development (PD) needs to be a

priority for educators as their teaching behaviors and practices affect student achievement (Shah, 2009). Through professional development, teachers gain a greater understanding of how their students learn, the content of the course, and pedagogy that can be used (Garet et al., 2001). As professional development is the most effective method for changing teacher practices (Supovitz & Turner, 2000), it is an essential component to aid in development of a successful teacher and program. Due to the important role PD plays in the shaping of teacher practices, measurement of the quality of the PD program must occur.

Studies in the past have produced six effective features of professional development that lead to change in teacher outcomes (i.e., implementation of practices and curricula) and can be used as a means for measuring effectiveness (Desimone et al., 2009; Garet et al., 2001). These features are form, duration, collective participation, coherence, content focus, and active learning. These features include three structural features: form of the activity, duration of the activity, and collective participation. There are two different forms of professional development - traditional and reform. The traditional form is similar to a long workshop or conference and reform is similar to teacher coaching. The duration of the PD considers the contact hours spent in the activity and the period that the activity spanned (Garet et al., 2001). Collective participation encourages teachers from the same department, school, or district to attend professional development trainings together to create an environment that stimulates deeper discussion and learning (Garet et al., 2001). The following three features are the core features, or substance, of the PD: content focus, active learning, and coherence of the program (Garet et al., 2001; U.S. Dept of Ed, 2006). Content focus considers the degree to which subject matter is prioritized and focused on during a PD training. Active learning within a PD consists of any opportunity that engages and actively involves students in the learning process (Center for Educational Innovation, n.d.). Coherence of the program ensures that the activities and curriculum learned reflect state and national standards and goals set for agricultural education (Garet et al., 2001). Along with these six features, feedback and reflection, models of effective practice, and coaching and expert support are additional features that have been identified for effective professional development (Bates & Morgan, 2018).

Training of agricultural educators has changed over the past 40 years due to the development of career and technical education (CTE) in the late 1980s (Asunda, 2012; Phipps et al., 2008). The development and revision of CTE lead to the investigation of integrating agriculture, and other CTE subjects, into the classroom. In the early 2000s, a group of researchers studied the integration of science into agricultural education (Layfield et al., 2001). From their research, they created a list of five themes that showcase the reasoning for the lack of integration of CTE into the classroom: “Did not receive adequate coursework to teach agriscience, shortage of in-service training, need for increased interaction between agriculture and science teachers, resources and support not always available in needed amounts, and pre-service teachers need experience with the integration of agriculture and science in the classroom” (Layfield et al., 2001, p. 423). The five themes indicate the need for improved professional development programs for agricultural education teachers. When considering five of the six effective features of professional development (i.e., all features except form) (Desimone et al., 2009; Garet et al., 2001) and the five themes discovered in the Layfield et al. study (2000), a connection between the two topics is easy to see. For example, the theme “need for increased interaction between agriculture and science teachers” connects with the feature “collective

participation,” and the theme “shortage of in-service training” connects with the feature “duration.” This connection indicates the need for measuring the effectiveness of professional development programs to ensure that the programs are providing effective and meaningful PD. While a CASE Institute is a specialized institution for professional development, it provides many of the themes recommended in the Layfield et al. study (2000). Upon completion of a two-week CASE Institute professional development, teachers have access to a year’s worth of curriculum (resources provided), relationships with a group of surrounding agricultural education teachers (increased interaction), and an understanding of the curriculum given (adequate coursework).

A CASE Institute professional development strives to equip and empower agriculture teachers in order to increase student engagement and achievement in agriculture (CASE, n.d.-b). The mission of CASE is to “impact student career readiness by empowering teachers with improved instructional practices and relevant curricula sustained by professional development” (CASE, n.d.-b). Though CASE research has previously been conducted, it has primarily been concentrated on curriculum, implementation, or experiences during the CASE Institute PD (Bird & Rice, 2021; Carraway et al., 2015; Lambert et al., 2014; Pauley et al., 2019; Tummons et al., 2020). Little research has been conducted specifically looking at the effectiveness of the traditional CASE Institute professional development program. Research Priority Area Five: Efficient and Effective Agricultural Education Program within the American Association for Agricultural Education’s National Research Agenda (Thoron et al., 2016) was addressed in this study as we are investigating an agricultural education professional development program.

As effective professional development changes teacher knowledge and practice (Darling-Hammond et al., 2017; Nguyen, 2018), this study will specifically examine the participants’ self-perceived mastery of the content, knowledge of the CASE model, and preparedness for implementation. As coaching, modeling, and expert support are effective features of professional development (Bates & Morgan, 2018), this study will analyze the participants’ perceptions regarding CASE Lead Teachers. CASE Institute research is essential for the agricultural education field due to the lack of prior research and the insight that can be gained from this professional development program.

Theoretical Framework

The theoretical framework for this study was adapted from the Garet et al. (2001) study on the relationship between the six features of effective professional development and teacher outcome. The six features are type, duration, collective participation, active learning, coherence, and content focus. The first three features are the structural features or how the PD is structured, and the remaining three features are the core features - the characteristics of the substance of the PD (Desimone et al., 2002). Type describes the format of the PD whether it's a reform (longer time period in informal settings) or traditional (commonly a 2-week session in a designated setting). Duration looks at the length of the PD in terms of hours, days, weeks, or months. Collective participation is the degree to which school districts send teachers of the same discipline to the same PD training. Active learning is the degree to which the PD uses activities that stimulate active learning. Coherence is achieved if the information taught at the PD aligns well with local, state, and national guidelines and standards. Content focus is the amount of content that is provided in the PD training sessions. This model discusses the importance of professional

development and the features required for an effective PD program. We used the six features for effective professional development as a guide to determine the effectiveness of the traditional CASE Institute PD courses (Figure 1).

Figure 1.
Effective Professional Development Garet et al. (2001)

Components	Description
Form	Reform vs. traditional (study groups or networks vs workshops)
Duration	Number of hours and span of time
Collective Participation	Participation by established groups
Content focus	Professional development aimed at increasing disciplinary knowledge
Active Learning	Meaningful analysis of teaching and learning
Coherence	Degree of consistency between professional development

Purpose and Research Objectives

The purpose of this study was to determine the effectiveness of the traditional CASE Institute professional development program using the participants' self-perceived preparedness for implementation to determine effectiveness. The following research objectives served as a guide for this effectiveness assessment.

1. Determine the effectiveness of the traditional CASE Institute professional development program
2. Assess the effectiveness of the CASE Institute Lead Teachers

Methods

Research Design

The purpose of this quantitative survey was to determine the effectiveness of the CASE Institute professional development program regarding teacher preparedness and CASE curriculum implementation. The survey instrument was an electronic questionnaire that included a mixture of mixed methods questions. The quantitative questions were checklists and Likert-type items. Agricultural education experts in survey research were asked to measure the instrument for face validity resulting in minor adjustments to the instrument. To reduce the threat for internal validity, the instrument was developed using Ary et al. (2018) guidelines for writing survey questions. To reduce measurement error, we created questions that were valid and reliable based on Ary et al. (2018) guidelines for writing survey questions. To control for external validity, we ensured an accurate list of participants was recorded, verifying with CASE Institute coordinators, before analyzing the data to reduce frame error.

Population

The intended target population for this research study was newly certified CASE Institute PD program participants. The researchers contacted CASE Institute national coordinators to request the list of participants for all the CASE Institute programs during the summer of 2019. To minimize frame error, the researchers checked for duplicated or missing names on the list. Based on demographic information, the CASE participants identified as agriculture (84.5%), science (5.5%), and other CTE (5.1%) secondary teachers. Upon their completion of the CASE

Institute PD programs, certified participants were contacted for their evaluation of their PD experience. All traditional CASE Institute PD program participants who had not participated in BriefCASE and Fast Track CASE programs were eligible for participation in our study.

Of the 477 participants in the traditional CASE Institute PD, 453 responded, resulting in a 94.9% response rate. Many (74.8%) of the participants were female and between the ages of 20 and 40 years old (34.9%). A majority of participants (82%) volunteered to participate in CASE PD and have their primary teaching license in Agricultural Science. While their experience varies, over half of the participants have had 5 years or less of secondary teaching experience (Table 1). Participants in CASE Institute are from all over the country with the largest populations from Iowa (12.21%), Illinois (6.62%), and Missouri (7.12%). For more information about participants see Table 1.

Table 1

Selected Demographic Data of Responding CASE PD Participants (N = 453)

Variable	<i>n</i>	%
Gender		
Female	339	74.80%
Male	113	25%
Other	1	0.20%
Age		
Less than 23 years	94	20.70%
24-30 years	158	34.90%
31-40 years	97	21.40%
41-50 years	66	14.60%
More than 50 years	38	8.40%
CASE Participation		
Assigned	55	12.10%
Volunteered	373	82.40%
Other	25	5.50%
Experience		
Preservice	67	14.80%
1-2 years	101	22.30%
2-5 years	100	22.10%
6-10 years	79	17.40%
11-20 years	72	15.90%
More than 20 years	34	7.50%
Primary Teaching License		
Agricultural Science	381	84.50%
Industrial Arts	1	0.20%
Other Career and Technical Education	23	5.10%
Science	25	5.50%
Other	21	4.70%

Note. CASE = Curriculum for Agricultural Science Education; PD = Professional Development. 'n' represents the subsample for whom we have complete data for each item.

Instrumentation

A web-based quantitative survey was used for this study to collect data from the participants. A descriptive research survey method was used to look at the effectiveness of CASE Institute and curriculum and its impact on potential teacher implementation in the classroom. The survey questionnaire was constructed in Qualtrics and followed Dillman's Tailored Design Method for Internet Surveys (Dillman et al., 2014). The survey was distributed to all eligible participants at the completion of the PD through an electronic link to the survey in Qualtrics.

The instrument was broken into 5 sections of questions to evaluate their CASE PD experience. The sections included: demographic information, teaching background and experience, assessment of the CASE PD, assessment of the Lead Teacher, and exploration of interest in potential new CASE PD programs. Demographic and teaching background and experience were collected so the researchers could describe and analyze the participants based on their answers. The assessment of CASE PD and their Lead Teachers was used to determine the participants' opinions on the CASE Institute attended. Participants' interest in future CASE Institutes allowed researchers to see the participants enjoyment and engagement in CASE Institutes. For the assessment of the CASE PD and Lead Teacher sections, the 5-point Likert-type scale was used with 1 = Strongly Disagree and 5 = Strongly Agree. The other three sections asked questions relating to demographic information, teaching background, and interest in new CASE PD programs. As participants were all given the same survey directly following the completion of their CASE Institute, the instrument was deemed reliable. A pilot test study was conducted for the instrument with CASE certified individuals not represented in this sample. Minor adjustments to the instrument resulted after the completion of the pilot test study.

Data Collection

Participants received an email explaining the research study along with a link to the survey questionnaire following the completion of their CASE Institute PD program. Survey participation was entirely voluntary. Informed consent was gathered through a single page at the beginning of the questionnaire. Any data that were missing or incomplete was removed prior to our data analysis to further control for measurement error. To deal with non-respondents, the researchers compared early and late respondents. No statistical difference was found between early and late respondents. In this institutional review board (IRB)-approved, quantitative, pilot survey research study, we used a researcher-created instrument to measure the effectiveness of the traditional CASE Institute professional development program using the participants' self-perceived preparedness for implementation to determine effectiveness (Ary et al., 2018).

Data Analysis

The data were collected through a Qualtrics quantitative survey that was distributed to the participants through their email. The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) to determine the mean and standard deviation of the data related to the assessment of CASE PD and the assessment of CASE Lead Teachers. These formulas were used to analyze the data to help determine the effectiveness of CASE PD and the potential for implementation in the classroom. To analyze the demographic and teacher background, data were used to calculate the percentages of the demographic variables to highlight the varying

population that took place in the study. All of the data collected and analyzed was organized and arranged into a series of tables to enhance readability and clarity of results.

Findings

Objective 1

To determine the effectiveness of the traditional CASE PD program, participants were asked several questions that relate to the PD's effectiveness. The questions also examined two of the six effective features of professional development, content focus and active learning (Garet et al., 2001). Most of the participants had a strong understanding of the CASE model (Table 2) which consists of the curriculum, assessment, certification, and professional development components. Participants strongly agreed when asked if they were prepared to implement the CASE curriculum into their classroom ($M = 4.50$; $SD = 0.71$). Several of the participants agreed, *the lessons and demonstrations facilitated my learning of the course content* ($M = 4.49$; $SD = 0.71$), indicating that the participants learned the content material during the PD course.

Table 2

Participants' Assessment of their CASE PD experience

<i>Variables</i>	<i>n</i>	<i>M</i>	<i>SD</i>
The CASE courses and CASE Institute are programs that will benefit other teachers in my region and state.	453	4.61	0.71
I have a solid understanding of the CASE model.	453	4.57	0.71
I am prepared to begin implementing CASE curriculum in my classroom.	453	4.50	0.71
The lessons and demonstrations facilitated my learning of the course content.	453	4.49	0.71
The expectations of the participants during the CASE Institute were clearly laid out and communicated to me.	453	4.48	0.71
The sequence of the day-to-day schedule was appropriate in order to prepare me to teach this curriculum	453	4.44	0.71
The CASE Institute classrooms/laboratories were organized and well prepared for instruction and learning	453	4.43	1.41
Facilitators were able to answer my technology questions.	441	4.39	0.79
The professional development experience at this CASE Institute exceeded my expectations.	453	4.29	1.41
The curriculum download process was simple.	445	4.27	1.41
The CASE Online delivery enhanced my professional development experience.	453	3.62	1.41
The technology of CASE Online enhanced my professional development experience.	418	3.55	1.25
CASE Online was easy to navigate.	410	3.53	1.18
I am interested in implementing CASE Online in my classroom.	428	3.15	1.31

Note. Based upon a 5-point Likert-type scale with 1= Strongly Disagree and 5= Strongly Agree. *f* = frequency; *M* = Mean; *SD* = Standard deviation. '*n*' represents the subsample for whom we have complete data for each item.

Objective 2

The second objective sought to assess the effectiveness of the CASE Institute Lead Teachers. To assess their effectiveness, participants were asked several questions related to their Lead Teachers' knowledge, demeanor, and teaching ability. These questions also examined one of the six features of effective professional development, collective participation (Garet et al., 2001). Most of the participants agreed that the Lead Teachers demonstrated knowledge and expertise in the subject area ($M = 4.60$; $SD = 0.71$). Their teaching demeanor was deemed professional by many of the participants (Table 3). Regarding their teaching ability, participants agreed that they offered time outside of class for help ($M = 4.65$; $SD = 0.71$), they understood and responded to the participants instructional needs ($M = 4.57$; $SD = 0.71$), they demonstrated how the PD content learned fits into the CASE curriculum ($M = 4.56$; $SD = 0.71$), they provided enhancements with support materials ($M = 4.55$; $SD = 0.71$), they were organized and prepared for class ($M = 4.54$; $SD = 0.71$), they created a conducive learning environment ($M = 4.54$; $SD = 0.71$), and they used effective modeling skills ($M = 4.49$; $SD = 0.71$). Many of the participants agreed to the statement, *I would take another course from this instructor* (Table 3).

Table 3
Participants' Assessment of CASE PD Lead Teacher

<i>Variables</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Offered and provided help outside of the normal class time, if requested.	453	4.65	0.71
Followed the scope and sequence (schedule).	453	4.62	0.71
Demonstrated knowledge and expertise in the course content.	453	4.60	0.71
Maintained a professional demeanor in the classroom.	453	4.57	0.71
Understood and responded appropriately to participants' instructional needs.	453	4.57	0.71
Demonstrated how individual lessons, activities and projects that are addressed during the CASE professional development programming fit into the broader context of the course curriculum.	453	4.56	0.71
Demonstrated knowledge and expertise with the course hardware and software.	453	4.55	0.71
Provided appropriate enhancements with support materials.	453	4.55	0.71
Well organized and prepared for class.	453	4.54	0.71
Created an atmosphere that was conducive to learning (i.e., provided timely breaks, considered learner needs, minimized distractions, etc.)	453	4.54	0.71
I would take another course from this instructor.	453	4.51	0.71
Modeled effective presentation skills and content delivery methods.	453	4.49	0.71

Note. Based upon a 5-point Likert-type scale with 1= Strongly Disagree and 5= Strongly Agree. f = frequency; M = Mean; SD = Standard deviation. ' n ' represents the subsample for whom we have complete data for each item.

Conclusions

The purpose of this study was to determine the effectiveness of the traditional CASE Institute professional development program. The participants' self-perceived preparedness for implementation was used to determine effectiveness. This research may be useful for agricultural educators, teacher preparation programs, and school districts that are interested in CASE certification. The researchers evaluated the research objectives using the data collected from the participants.

Objective One

When considering the first research objective, *Determine the effectiveness of the traditional CASE Institute professional development program*, we found the participants' PD experiences to be effective. The participants indicated a conclusive understanding of the CASE model, self-perceived preparedness to implement the CASE curriculum, and their learning of the content material. However, our data is from their self-perceived analysis of their knowledge and abilities. As many of the participants agreed that the lessons and demonstrations facilitated their learning, the participants identified that learning took place. An outcome for effective professional development is a change in a teacher's professional knowledge, attitude, or practice (Darling-Hammond et al., 2017; Nguyen, 2018). Thus, their learning/change in knowledge and practice equates to an effective PD experience.

When considering the first research objective, two of the six effective features of professional development were identified. Content focus was examined as participants were asked to evaluate the materials and demonstrations utilized during their PD sessions and identify if they facilitated in their learning the content. Many of the participants found the lessons and activities to be helpful in their learning of the CASE curriculum. Participants were also asked to rate their understanding of the CASE model and their self-perceived preparedness to implement the material into the classroom. The participants' responses identified the usage of the feature content focus because the participants expressed their understanding of the material and their ability to implement the material. Though active learning was not part of this study, the use of active teaching is implied as many of the participants agreed that the provided lessons and demonstrations facilitated their learning. Participants also had the ability to use the materials that are a part of the CASE curriculum, further supporting the role of active teaching.

Objective Two

For the second research objective, we analyzed the participants' perceptions of the Lead Teachers. The researchers found the participants strongly agreed that their Lead Teachers were highly knowledgeable and valued in their content area, responded to instructional needs, created a conducive learning environment, met with the participants outside of class, and they used effective modeling skills. As coaching, modeling, and expert support are effective features of professional development (Bates & Morgan, 2018), the CASE Institute Lead Teachers can be considered effective based on the participant's high praise and feedback.

Collective participation cannot be explicitly described as this study did not focus on this feature of PD. Though the study did not specifically look at collective participation amongst the participants, there were several states and regions that had a considerable number of participants from the same areas. Because many of the participants came from similar areas, there is an aspect of potential collective participation as these teachers can relate and work together as they most likely face similar challenges. Also, the interactions between the Lead Teachers and the participants could be considered collective participation as CASE Institute Lead Teachers are fellow educators.

Of the six effective features of professional development, only three of the six were identified according to the research objectives for this study. The remaining three were present

but not studied explicitly. The form of the PD training was a traditional form of PD as it was a structured eight to nine full days of PD training. The duration of the PD was the same amongst all PD sessions and was unchanged from the previous years' PD sessions (CASE, n.d.-c). Coherence is valued in CASE as they integrate Next Generation Science Standards (NGSS), AFNR Common Career and Technical Core Content Standards, Common Core Standards for High School Mathematics, and Common Core Standards for English Language Arts into their curriculum and PD sessions (CASE, n.d.-d).

High quality, effective professional development is an integral part of teacher preparation as it can create a change in teaching practice and student outcomes (Archibald et al., 2011). Before the creation of CASE, CTE classrooms were lacking in the integration of science and agriculture as their teachers were not receiving adequate training and curriculum for this integration to occur (Castellano et al., 2003). To further illustrate the inadequacies of the CTE program, Layfield et al., identified five themes that highlight the issues in CTE teacher preparation (2001). Though one PD program cannot fully alleviate the issues brought up in the Layfield et al. (2001) study, CASE PD has provided a potential solution for a few of the themes. For example, CASE supplies all certified participants with curriculum that will last for an entire year which meets the need for “did not receive adequate coursework to teach agriscience” and “pre-service teachers need experience with the integration of agriculture and science in the classroom” (Layfield et al., 2001). Based on the participants' self-perceived preparedness and their high praise of their Lead Teachers, we conclude that the traditional CASE Institute PD courses were effective and could result in potential classroom implementation.

This research study was conducted to answer the question of the effectiveness of traditional CASE Institute PD and the CASE Lead Teachers. As CASE is becoming more popular with agricultural education, CTE, and science teachers across the country, it is important to research all aspects of the CASE model. This study specifically focused on the professional development component of CASE because of the gap in the literature and the potential impact CASE PD can have on a teacher, and in turn, their students.

Recommendations & Future Research

Utilizing the data collected from the participants, we were able to draw conclusions and provide recommendations based on our findings regarding the effectiveness of the traditional CASE Institute PD courses. Many of the participants strongly agreed when asked if other teachers in their region would benefit from CASE PD. Based on these results, researchers recommend agricultural education teachers and other interested teachers to utilize CASE PD and curriculum when desiring more educational training and classroom content. Further research is required to fully establish the effectiveness of CASE PD. The researchers were able to discern the comfort level of the participants for implementing the material, but they did not contact the participants after the initial survey. Future research should verify teacher implementation and consider the methods of implementation. It would also be prudent to look at the potential issues teachers are facing when implementing the material and how CASE can adapt the curriculum or PD sessions to address and alleviate these issues. Further research would allow for a complete understanding of the effectiveness of traditional CASE PD sessions and help resolve any issues with implementation. It would be prudent to investigate the three features of effective PD that were not explicitly researched in this study. For collective participation, future researchers could

examine the relationships between the participants and the Lead Teachers. For duration, researchers could examine how the number of contact hours affects the implementation success. For type, researchers could work with CASE to create a reform type of PD and compare the feedback from the traditional and reform type of PD.

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