RESEARCH CONFERENCE PROCEEDINGS

North Central Region

American Association for Agricultural Education

Research Session Coordination
University of Nebraska - Lincoln

Research Conference Coordination
University of Minnesota

Conference Host
University of Minnesota
Minneapolis, MN

Friday, October 2, 2015

Review Process for the North Central Research Conference

The AAAE North Central members express their sincere gratitude to NC AAAE colleagues who served as reviewers for research abstracts submitted for the 2015 North Central Research Conference. A total of 24 research manuscripts were submitted. The AAAE Protocol Guidelines for Conference Paper Selection were used in the paper review and selection process. Sixteen abstracts were selected for presentation at the 2015 North Central Conference.

Manuscript Reviewers for 2015 AAAE North Central Region Research Conference

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2015 North Central Research Conference
Friday, October 1, 2015
8:00 A.M. to 9:30 A.M. - Research Session I

Concurrent Session A

Theme: Teacher Preperation and Beginning Teachers
Discussant: Daniel Foster, The Pennsylvania State University
Facilitator: OP McCubbins, Iowa State University

Concurrent Session B

Theme: Career Development Events (CDE) & High School Experiences
Discussant: Erica Thieman, University of Illinois at Urbana-Champaign
Facilitator: Jamie Loizzo, University of Nebraska - Lincoln

Friday, October 1, 2015
10:00 A.M. to 11:30 A.M. - Research Session II

Concurrent Session C

Theme: Leadership Perspectives
Discussant: Gina Matkin, University of Nebraska - Lincoln
Facilitator: Mary Rodriguez, The Ohio State University

Problems of New Agriculture Teachers: Do They Change During the First Year of Teaching

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Introduction

Researchers have a deep understanding about problems new teachers experience during their first year of teaching (Myers, Dyers, & Washburn, 2005; Talbert, Camp, & Heath-Camp, 1994; Veenman, 1984). However, little is known about how problems change during this critical phase of a new agriculture teacher's career. It is believed that understanding the changing nature of problems and providing appropriate teacher induction support will assist with new teacher success, satisfaction, and retention (Boone & Boone, 2009).

Literature Review

Veenman (1984) was the first researcher to conduct a meta-analysis on problems of new teachers. He analyzed and compiled the results from 83 studies and concluded the eight problems most often experienced by new teachers were classroom discipline, motivating students, dealing with individual differences, assessing students' work, relationships with parents, organization of class work, insufficient materials and supplies, and dealing with problems of individual students.

Many researchers support Veenman's conclusions. Classroom management has consistently been identified as a major problem experienced by new teachers (Boone & Boone, 2009; Hachmeister, 1981; Joerger, 2002; Joerger & Boettcher, 2000; Mundt & Connors, 1999; Myers et al., 2005; Nichols & Mundt, 1996; Shippy, 1981;Talbert et al., 1994). Student motivation (Boone & Boone, 2009; Evans & Tribble, 1986; Garton & Chung, 1996; Joerger, 2002; Mundt & Connors, 1999) and teaching to individual students' abilities (Evans & Tribble, 1986) have been recognized as new teacher challenges.
Organizational skills (Birkenholz & Harbstreit, 1987; Joerger & Boettcher, 2000; Mundt & Connors, 1999; Talbert et al., 1994) and time management (Boone & Boone, 2009; Hachmeister, 1981; Mundt & Connors, 1999; Talbert et al., 1994) are needed by new teachers. Other researchers have concluded new teachers face problems with balancing their career responsibilities and their personal lives (Boone & Boone, 2009), maintaining personal motivation and a positive outlook (Mundt & Connors, 1999), lack of spare time (Ganser, 1999), and stress (Joerger & Boettcher, 2000; Nichols & Mundt, 1996).
Specific to new agriculture teachers is the added responsibility of program management and developing the integrated agricultural education model (Birkenholz & Harbstreit, 1987; Edwards & Briers, 1999; Garton & Chung, 1996; Greiman, Walker, & Birkenholz, 2005; Mundt & Connors, 1999; Talbert et al., 1994).

Theoretical Framework

Support for our theoretical framework is drawn from literature pertaining to teacher development and the concerns of new teachers during their first year of teaching. Cheney, Krajewski, and

Combs (1992) built upon the work of Fuller (1969) and Katz (1972) and identified the needs and microphases of development that new teachers pass through during their first year. These five microphases include (a) order and time filling, (b) timing, planning, and management, (c) experimentation, (d) long-range planning, and (e) focus on students.

Cheney et al. (1992) concluded that during the order and time filling microphase, teachers were busy preparing enough work to keep their students occupied and were keeping students busy and orderly. During the timing, planning, and management microphase, new teachers learned to pace their teaching at an appropriate rate, were better prepared due to improved planning, and were able to manage their classroom more effectively. In microphase three, teachers were more confident in experimenting with new teaching techniques and resources. When new teachers entered the long-range planning microphase, they thought about the rest of the school year and started planning for next year. Finally, as new teachers progressed into the fifth microphase they began focusing more on their students and meeting individual student needs.

Purpose and Research Questions

The purpose of this study was to determine if problems of new agriculture teachers change during the first year of teaching. The following research questions were developed to guide the study:
1. What are the problems of new agriculture teachers at the beginning of their first year of teaching?
2. What are the problems of new agriculture teachers at the end of their first year of teaching?
3. How did the problems of new agriculture teachers change from the beginning of the year compared to the end of the year?

Methods and Procedures

The target population for this study was new agriculture teachers who participated in the [state] Teacher Induction Program (TIP). The TIP began during the 1999-2000 school year to provide a professional learning community to assist new teachers' development, efficacy, success, and retention. Participants in the study were new teachers in the 2010-2011, 2011-2012, and 2012-2013 school years ($n = 45$).

A researcher at the [university] created the questionnaire based on Veenman's (1984) problems of beginning teachers (1984). The questionnaire consisted of 24 problems associated with new teachers. A 4-point Likert-type scale (1 = *not a problem*, 2 = *minor*, 3 = *moderate*, 4 = *major*) was utilized to elicit responses from the participants. The researcher determined the questionnaire to be valid based on previous research studies using Veenman's questions. Post hoc reliability analysis yielded a Cronbach's alpha of .90.

Dillman's (2000) Tailored Design Method was used to guide the data collection process. The questionnaire was administered at the beginning of the school year and at the end of the school year. To best gauge if perceptions changed during the year, only participants who completed

both questionnaires were included in the study. This resulted in 27 new teachers being part of the study for a response rate of 60%.

A paired-samples *t* test was conducted to answer research question three. The alpha level was established a priori at .05. Data were exported from a Microsoft Excel spreadsheet to the Statistical Package for the Social Sciences (SPSS) for analysis.

Findings

The first research question was: What are the problems of new agriculture teachers at the beginning of their first year of teaching? As displayed in Table 1, the teachers identified five *moderate* problems ($M = 2.50$-3.49). The problem with the highest mean score was classroom discipline ($M = 2.81$, $SD = .88$) followed by knowledge of subject matter ($M = 2.67$, $SD = .68$), motivating students ($M = 2.67$, $SD = .83$), lack of spare time ($M = 2.63$, $SD = .93$), and organization of class work ($M = 2.59$, $SD = .89$). Participants identified the remaining 19 problems as being in the *minor* category (1.50-2.49). The problem with the lowest mean score was regarding relations with principals/administrators ($M = 1.70$, $SD = .61$).

The second research question was: What are the problems of new agriculture teachers at the end of their first year of teaching? As shown in Table 1, there were two *moderate* problems. The problem with the highest mean score was lack of spare time ($M = 2.78$, $SD = 1.01$) followed by burden of clerical work ($M = 2.67$, $SD = .68$). There were 21 problems perceived to be *minor* problems. The problem with the lowest mean score was relations with colleagues ($M = 1.48$, $SD = .92$), placing it into the *no problem* category.

The third research question was: How did the problems of new agriculture teachers change from the beginning of the year compared to the end of the year? As shown in Table 1, 22 of the 24 problems showed a decrease in severity as the year progressed. Further, a statistically significant difference was found for seven problems as identified by $p < .05$. All but one of the seven problems significantly decreased; burden of clerical work ($t = -3.32$) significantly increased as a perceived problem from the beginning of the year to the end of the year.

Table 1
Paired-Samples t test for Perceived Problems of New Agriculture Teachers

Problem	Beginning of year		End of year			
	M	*SD*	*M*	*SD*	*t*	*p*
Classroom discipline	2.81	.88	2.44	.89	2.43	.02*
Knowledge of subject matter	2.67	.68	2.19	.74	3.57	.00*
Motivating students	2.67	.83	2.44	.80	1.03	.31
Lack of spare time	2.63	.93	2.78	1.01	-.78	.44
Organization of class work	2.59	.89	2.30	.78	1.55	.13
Effective use of different teaching methods	2.44	.75	2.11	.70	2.55	.02*
Determining learning level of students	2.41	.64	2.30	.47	.83	.42
Dealing with problems of individual students	2.37	.69	2.22	.70	.94	.36
Inadequate school equipment	2.37	.84	2.37	.74	.00	1.00
Effective use of textbooks and curriculum guides	2.37	.84	2.37	.79	.00	1.00
Planning lessons and school days	2.33	.73	2.11	.85	1.30	.21
Insufficient materials and supplies	2.31	.79	2.12	.95	1.04	.31
Burden of clerical work	2.19	.79	2.67	.68	-3.32	.00*
Dealing with slow learners	2.15	.77	2.15	.60	.00	1.00
Awareness of school policies and rules	2.11	.80	2.07	.73	.23	.82
Heavy teaching load resulting in insufficient prep time	2.11	.80	1.89	.89	1.06	.30
Dealing with students of different cultures and deprived backgrounds	2.11	.93	1.56	.70	3.40	.00*
Dealing with individual differences	2.07	.55	1.74	.66	2.36	.03*
Large class size	2.04	1.06	1.96	.98	.49	.63
Inadequate guidance & support	2.00	.88	1.89	.85	.46	.65
Assessing students' work	1.93	.55	1.78	.70	1.00	.33
Relations with parents	1.92	.48	1.58	.58	2.37	.03*
Relations with colleagues	1.84	.90	1.48	.92	1.74	.10
Relations with principals/administrators	1.70	.61	1.63	.84	.47	.65

4-point scale (1 = *not a problem*, 2 = *minor*, 3 = *moderate*, 4 = *major*).
*$p < .05$

Conclusions, Discussion, and Recommendations

The purpose of this study was to determine if problems of new agriculture teachers change during the first year of teaching. This research is unique in that it contributes a greater understanding to what we know about new teachers and their problems as participants were from three different cohorts and only matched pairs were utilized for analysis. Readers are cautioned that the results of this study should not be generalized beyond the target population.

A major conclusion of this study was the significant decrease in severity of problems perceived by new agriculture teachers. Problems that significantly decreased in severity from the beginning of the year to the end of the year were classroom discipline, knowledge of subject matter, effective use of different teaching methods, burden of clerical work, dealing with students of different cultures and deprived backgrounds, dealing with individual differences, and relations with parents. Many of these are common problems of new teachers (Myers et al., 2005; Talbert et al., 1994; Veenman, 1984). This is an encouraging finding and could help the psychological aspect of new teachers. Perhaps knowing previous teachers have experienced and resolved similar problems could help increase new teachers' self-efficacy. Teachers with greater confidence are more likely to experience higher levels of job satisfaction which contribute to reduced teacher attrition (Boone & Boone, 2009).

There was one problem that significantly increased in severity, which was burden of clerical work. Knowledge of the severity of this problem may be helpful to create awareness so new teachers can anticipate and develop strategies to lessen clerical work. Organizers of the [state] TIP could plan appropriate professional development to assist new teachers with managing clerical work (Greiman et al., 2005).

Another major conclusion is that findings of this study provide some support for Cheney et al.'s (1992) framework regarding the microphases of development during the first year of teaching. This study identified classroom management as a moderate problem at the beginning of the year. This problem aligns with microphase one: order and time filling. Further, almost all of the problems of new agriculture teachers decreased in severity during the first year of teaching. This finding provides some indication that the new teachers were making progress moving through the five microphases

As a result of the findings, it is recommended that future investigations are needed to fully understand what influences the change in problems during the year. Many forms of support are provided to new agriculture teachers. It is necessary to determine the specific variables that contribute to resolving problems of new teachers. In addition, Cheney et al. (1992), found the order of the microphases did not change for new teachers, but the timing for the new teachers to complete the phases differed, some longer than the first year of teaching. Future research should be conducted to determine why some new teachers progress at a faster rate than others.

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**Analyzing Student Teachers Reflective Practice through
Tuning Protocol Video Transcription**

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Introduction

A criterion for involvement in acute professional discovery is the awareness that teaching is a professional pursuit, something that is cyclically contingent to adjustments and enhancements through analysis and reflection (Lester & Mayher, 1987, p. 203). Dewey (1933) and Sch*ö*n (1983) established reflection as a critically important component of learning where practice can be facilitated by evaluating one's own professional history (Kolb, 1984).

Grounded in the work of Dewey (1933), and Sch*ö*n (1983), Greiman and Covington (2007) sought to acquire acumen relative to the method of "developing reflective practitioners" (p. 115) through student teachers' journal writing experiences. Greiman and Covington (2007) found that the preferred modality of reflection was verbal reflection followed by self-reflection and finally written reflection.

Instructional planning has continuously been identified as a focus of the curriculum in teacher preparation programs; however, there is a narrow body of research in agricultural education in this area (Greiman, & Bedtke, 2008). Sung (1982) suggested that teachers who use well-structured instructional plans generate higher student achievement when compared to those who use less structured instructional plans.

With the goal of learning about methods to improve quality instructional designers, researchers utilized the tuning protocol as a framework for this study. The tuning protocol is a process of peer review and reflection and is outlined in Figure 1. Paulsen, Smith, & Anderson (2014) utilized a modified tuning protocol (Allen & McDonald, 1993) with preservice student teachers as part of a professional development activity for the improvement of lesson planning and implementation. Preservice teachers found the protocol process beneficial for "future improvement of lesson design, implementation, and impact of teaching" (Paulsen, Smith, & Anderson, 2014, p. 110).

In the present study we aimed to couple the significant importance of instructional design and reflection to the profession of teaching with the reflection modality preferred by student teachers. While there is a vast array of components of teaching that can be reflected upon, this study focused on instructional design. The efforts of this study were designed to increase the body of knowledge around reflective practices and instructional design in agricultural education given the importance of becoming competent instructional planners. The amalgamation of preferred reflective practices and significance of effective instructional design led to the purpose of this study: What can be learned about preservice teachers' reflective practices during the tuning protocol process? The following research questions guided this study:

- What are the problems identified by the preservice teachers relative to their previously implemented lesson plan when using the tuning protocol process?
- What are the suggestions offered by student teaching peers, which aimed to improve their peers' lesson plan problems stated during the tuning protocol process?
- What suggestions did the preservice teachers plan to implement for future lesson plan improvement based on the peer feedback given during the tuning protocol process?

Conceptual Framework

The conceptual framework of Easton (2009) and Allen and McDonald (1993) served as the foundation of this study. Breidenstein, Fahey, Glickman, and Hensley (2012) as well as McDonald et al. (2007) have noted the importance of protocols in education and the ability of a protocols' guided structure to prompt and provide reflective feedback in education, particularly when utilizing the protocol for the purpose of instructional design. The tuning protocol used in this study was modified and is represented in Figure 1.

20 Minute Lesson Plan Tuning Protocol		
Presentation	Presenter shares the problem or draft of the plan currently under development and provides relevant information about efforts to date	5 minutes
Clarifying Questions	Group asks clarifying questions of the presenter. Solutions are not yet offered.	2 minutes
Silent Idea Generation	Members write down ideas or suggestions	3 minute
Group Discussion	Group discusses ideas and solutions. The presenter listens and records suggestions.	8 minutes
Reaction	Presenter reacts to any responses he or she chooses. This is their opportunity to reflect upon new ideas they received.	2 minutes

Figure 1. Tuning protocol procedure adapted from Easton, 2009

David Allen and Joseph McDonald (1993) developed tuning protocols at the Coalition of Essential Schools. McDonald described tuning protocols as a technique that allows teachers to demonstrate actual work to a group of peers in a structured, reflective discourse with the goal of

obtaining thoughtful, critical feedback to 'tune' (Allen, 1995) the work to an elevated standard (Allen, 1995; Easton, 1999; McDonald et al., 2007).

Methodology

The population of this study was preservice agricultural education students (*N*=13) from Iowa State University who participated in the student teaching experience during the spring of 2015. This study utilized qualitative data interpreted from a quantitative perspective. Creswell and Plano Clark (2011) suggested that mixed methods studies determine the means by which qualitative data can be transformed into quantitative data to determine descriptive measures (i.e., frequencies and percentages). The tuning protocol was employed during the mid-term and final meetings to allow for student teachers to become accustomed to the tuning protocol. The data for this study were gleaned from the tuning protocol during the final professional development session following the student teaching experience.

Student teachers were asked to bring a lesson plan and accompanying student work from a lesson that went well during their student teaching experience. In addition, the student teachers were asked to identify a component of the lesson they desired to improve. The student teachers were assigned to a peer group of three. One student teacher was designated as the presenter and the others provided feedback during the tuning protocol process. Graduate students facilitated the groups by serving as timekeepers and prompting conversation during ineffective communication periods. The tuning protocol was modified from the original framework of one hour to twenty minutes (Easton, 2009) to align with time constraints (Paulsen, Clark, & Anderson, 2014). Student teachers followed the protocol as outlined in Figure 1.

The tuning protocol process was recorded by iPad and microphones were used to enhance audio quality. The captured video was manually transcribed. The following segments of the tuning protocol were the focus of the transcription and coding: Presentation, Group Discussion and Reaction.

Qualitative investigation requires rigorous attention to language and intense reflection on developing patterns (Saldaña, 2013, p.10). The rigorous investigation through coding began with preliminary jottings as video transcription occurred (Saldaña, 2013, p. 20). For example, problems stated by the presenters were bolded in the midst of transcription. Descriptive coding was the coding method selected, because the researchers wanted to know "what is going on here?" (Saldaña, 2013, p. 88).

Examples of the patterns that developed in coding include statements from presenters such as "keeping students on track" or "had to micromanage disruptive students" which were coded as classroom management. There were also various methods suggested like capture attention and setting context for the lesson that were coded as interest approach. There were some suggestions made about semantics such as using the term "noxious plant" instead of "weed," and they were coded as semantics. Real world application was a frequent code that was associated with phrases such as "visit Iowa State" or "go to a local greenhouse and observe in real environments." The code "denied feedback" was given to statements where presenters acknowledged specific suggestions and either explicitly stated they would not implement such

feedback, or they did not make a commitment to implement. Facilitator feedback was included in the coded data, as their input could have altered student teacher input.

Results

The goal of objective one was to determine problems identified by student teachers regarding implementation of their selected lesson plan during the tuning protocol process. Classroom management led the areas of concern representing 23.86% ($f = 5$) of the problems as reported in Table 1. Time management represented 19.05% ($f = 4$) of the concerns. The remaining nine areas were fairly evenly distributed.

Table 1

Areas of Concern Identified by Student Teacher Presenters (n = 13)

Problem	*f*	*%*
Classroom Management	5	23.86
Time Management	4	19.05
Establishing Expectations	2	9.52
Methods	2	9.52
Checking for Understanding	2	9.52
Assessment Methods	1	4.76
Content	1	4.76
Engagement	1	4.76
Identifying Science Standards	1	4.76
Real World Application	1	4.76
No Problem Identified	1	4.76

Note: Total number of responses is greater than the number of student teacher participants as some identified more than one area of concern.

Table 2 displays data relative to the suggestions that were offered by the peers providing feedback. Though real world application was identified as a problem 4.76% of the time, real world application was the suggestion made most often by peers ($f = 21$, 31.34%).

Table 2

*Suggestions by Student Teacher Peer Reviewers (*n = 13*)*

Suggestion	*f*	*%*
Real World Application	21	31.34
Extrinsic Motivation	9	13.43
Methods	8	11.94
Content	7	10.45
Semantics	6	8.96
Setting Expectations	4	5.97
Interest Approach	4	5.97
Time Management	3	4.48
Checking for Understanding	3	4.48
Assessments	1	1.49
Classroom Management	1	1.49

As reported in Table 3, presenters ($f = 13$, 40.63%) acknowledged specific feedback that was identified and yet denied to implement the feedback. The feedback that was most commonly accepted to implement was methods. Assessments and classroom management were the most frequently denied.

Table 3
*Reactions and Implementations by Student Teacher Presenter (*n $= 13)$

Implementations	f	$\%$
Denied Feedback	13	40.63
Methods	7	21.88
Content	3	9.38
Classroom Management	2	6.25
Interest Approach	2	6.25
Real World Application	2	6.25
Expectations	1	3.13
Extrinsic Motivation	1	3.13
Time Management	1	3.13

Note: Total number of responses is greater than the number of student teacher participants as some identified more than one strategy to implement.

Conclusions/Implications/Recommendations

The data gathered in this study suggest a varied understanding of effective instructional planning. We conclude that there was a strong disconnect between stated problems and suggested feedback. For example, extrinsic motivation was suggested 13.43% ($f = 9$) of the time, while student teacher presenters never identified motivation techniques as a problem. However, this could have been in response to problems such as classroom management or methodology. This leads us to believe that either the presenter or the peer reviewer may not have a strong understanding of the best method to implement the lesson. The most compelling evidence to support this claim is that much of the peer feedback provided was disregarded by presenters as valuable. ($f = 13$, 40.63%). This seems to be in conflict with the findings of Paulsen, Smith, and Anderson (2014). We recommend that the tuning protocol be implemented in initial stages of lesson plan development with follow-up to determine implementation of peer feedback. Focus group discussions could help to further extract student rationale regarding the use of peer feedback.

Teacher educators, specifically those who manage the student teaching process, can best utilize the results gathered in this study. "An important goal of teacher preparation programs is to convince preservice teachers of the significance of instructional planning and assist them in becoming effective instructional planners" (Baylor & Kitsantas, 2005, p. 434). The exercise of lesson plan execution and reflective practice as expressed through the tuning protocol should be repeated multiple times throughout the semester. The best method to implement and plan a lesson is less the goal as is the practice of reflection and continued growth for student teachers. Repeating the tuning protocol at various stages in the student teaching experience is suggested.

"Tuning Protocol Partners" would be a suggested method allowing two student teachers to pair up and implement the tuning protocol on a recently given lesson - rotating partners throughout the semester as a means to gain varying perspectives. Further qualitative evaluation of documents would help to triangulate findings. In addition to peer tuning protocol sessions, sessions with a teacher educator is also suggested to engrain the most appropriate methods for instructional design.

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Student Teacher Activities—Are They Relevant? The University Supervisor's Perspective

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Introduction

The importance of the student teaching experience is hard to ignore. Identified as "a central component of virtually all preservice teacher education programs" (Borko & Mayfield, 1995, p. 502), this well-documented capstone experience (Edgar, Roberts, & Murphy, 2009; Smalley, Retallick, & Paulsen, 2015) provides preservice teacher candidates with the opportunity to connect theory with practice (Cuenca, Schmeichel, Butler, Dinkelman, & Nichols, 2011; Retallick & Miller, 2007). Considered "the single most influential factor in…teacher education programs" (Steadman & Brown, 2011, p. 51) its' power has been described as "legend" (Valencia, Martin, Place & Grossman, 2009, p. 304).

The traditional student teaching experience includes a complex, triadic relationship between student teacher, cooperating teacher, and the university supervisor (Slick, 1997). Studies seeking to understand this experience from the viewpoint of the student teacher are plentiful (Ezer, Gilat, & Sagree, 2011; Krysher, Robinson, Montgomery, & Edwards, 2012; Rubenstein, Thoron, & Estepp, 2014; Smalley, Retallick, & Paulsen, 2015; Stripling, Thoron, & Estepp, 2014; Tarman, 2012; Thieman, Marx, & Kitchel, 2014; Young & Edwards, 2006). Research relating specifically to the student teacher's relationship with the cooperating teacher (Jones, Kelsey, & Brown, 2014; Kasperbauer & Roberts, 2007; Martin, 1997; Stoddart, 1990; Thobega & Miller, 2008) and the perspective of the cooperating teacher (Anderson, 2007; Borko & Mayfield, 1995; Clark, Triggs, & Nielsen, 2014) are commonly found in the literature. Since much research has examined student teaching from individual triadic perspectives (Valencia, et al., 2009), not all perspectives of the student teaching experience have been well-documented (Slick, 1997); research specific to the university supervisor has been considered meager at best (Steadman & Brown, 2011).

In addition to the primary responsibility of planning and ultimately evaluating the preservice teacher (Valencia et al., 2007), university supervisors can have a positive effect on student teacher performance (Grossman et al., 2011; Ronfeldt & Reininger, 2012), and provide a significant contribution to the student teaching experience (Slick, 1997). Therefore it is surprising that a great deal "remains unknown about the influence of university supervisor" (Borko & Mayfield, 1995).

"What we learn from studying the process of learning to teach depends on whose voices are being heard (Wideen, Mayer-Smith, & Moon, 1998, p. 156). Following the recommendations of Harlin, Edwards, and Briers (2002), Smalley, Retallick, and Paulsen (2015a, 2015b) examined the relevance of student teaching practices from the perspective of the student teacher and cooperating teacher; yet the voice of the university supervisor has remained essentially silent. The purpose of this study is to seek this triadic member's perspective.

Theoretical Framework

Grounded in the functional context education theory (FCE) of learning (Sticht, 1975), FCE builds upon cognitive development theory, considering society and culture as a "primary means for the transmission of cognitive abilities" (Sticht, 1975, p. 4) and that knowledge is developed as it is being applied. Building upon the importance of context for the learning environment, this study identifies activities relevant to "preparing and developing teachers as adaptive experts in all learning contexts" (Doerfert, 2011, p. 22). This study sought to determine the extent to which university supervisors in agricultural education deem traditional student teaching skills and activities relevant as part of the capstone student teaching experience.

Methods/Procedures

The population for this descriptive census study consisted of all ($N = 62$) university supervisors from 32 institutions with agricultural teacher education programs in the North Central Region of the American Association for Agricultural Education (AAAE) as identified through the AAAE directory, National FFA database, and a web search of online program directories.

A document analysis of agricultural education student teaching handbooks from the North Central Region of AAAE was completed to determine student teaching skills and activities utilized in agricultural teacher education programs. Skills and activities were organized into eight constructs including: planning instruction, teaching activities, evaluation of student performance, supervised agricultural experience, FFA activities, school-community relations, adult education, and teaching profession. The researcher-developed instrument was reviewed by a panel of experts consisting of six agricultural teacher educators and deemed valid.

Smalley, Retallick and Paulsen (2015) piloted the instrument and reported internal consistency for each summated scale by construct (Table 1) as recommended by Nunnally and Bernstein (1994). Reliability coefficients ranged from $\alpha = 0.72$ to $\alpha = 0.88$ and were considered acceptable to good (George & Mallery, 2003).

Table 1
Constructs, Number of Items, and Internal Consistency of Researcher-Designed Instrument from Pilot Study

Construct	Number of items	Alpha[a]
School–community relations	14	0.88
Planning instruction	14	0.87
SAE	10	0.84
Teaching profession	8	0.82
FFA	15	0.81
Evaluation of student performance	5	0.79
Teaching	18	0.76
Adult education	5	0.72

Dillman, Smyth, and Christian's (2009) tailored design method was used to develop the electronic survey instrument and the data collection process. Student teaching activities identified through document analysis were not identical among programs, but were summarized and developed into constructs. University supervisors were asked to evaluate the perceived relevance of each student teaching skill or activity by construct on a three-point Likert-type scale (1 = *irrelevant*, 2 = *relevant*, 3 = *very relevant*). The midpoint of the scale—*relevant*—was determined because the statements were derived from handbooks and activities currently required in agricultural teacher education capstone experiences. Jacoby and Matell (1971) found justification in scoring Likert-type scaled items dichotomously or trichotomously and concluded that "reliability and validity are independent of the number of scale points" (p. 498).

The usable response rate was 79.03% (*n* = 48) from this census study of university supervisors in the North Central region of AAAE. Nonresponse error was controlled by comparing early and late respondents as recommended by Lindner, Murphy, and Briers (2001). No statistically significant differences were found. Data were analyzed to determine construct grand means and standard deviations. To categorize each statement and construct, we established the following mean ranges: very relevant = 3.0–2.34, relevant = 2.33–1.67, and irrelevant = 1.66–1.00.

Results/Findings

The purpose of this study was to determine the extent to which university supervisors deemed traditionally required student teaching skills and activities relevant as part of the capstone student teaching experience. Summated means (grand means) are reported for each of the eight constructs (Table 2). University supervisors considered seven of the eight constructs very relevant and one construct—*adult education*—as relevant for student teaching.

Table 2

Relevance of Constructs Perceived by University Supervisors

Construct	Grand mean	*SD*
Evaluation of student performance	2.94	0.20
SAE	2.77	0.39
FFA	2.66	0.46
Teaching	2.61	0.38
Planning instruction	2.58	0.48
Teaching profession	2.57	0.45
School–community relations	2.53	0.51
Adult education	1.97	0.70

Note. Scale: 1 = Irrelevant, 2 = Relevant, 3 = Very relevant.

Evaluation of student performance construct (*GM* = 2.94, *SD* = 0.20) activities focused on methods of student evaluation used during student teaching. Respondents considered all evaluation activities in this construct area as being very relevant.

Supervised Agricultural Experience (SAE) construct (*GM* = 2.77, *SD* = 0.39) activities focused on helping preservice student teachers gain a better understanding of this component of the school-based agriculture education program through activities related to planning, implementing, following-up, teaching with, and communicating to stakeholders about SAE. University supervisors considered all SAE activities as very relevant.

FFA construct (*GM* = 2.66, *SD* = 0.46) activities focused on providing preservice student teachers with experiences in providing leadership development and collecting and reviewing of documents to enhance understanding of the FFA program. University supervisors considered all but two FFA activities as being very relevant. Respondents considered *review procedures for state and county fair entries* and *assist in organizing the local FFA test plot* as being relevant.

Teaching construct (*GM* = 2.61, *SD* = 0.38) activities associated with the student teaching experience focused on implementing pedagogical and management practices in a variety of settings. University supervisors considered all but two teaching activities as very relevant. Respondents identified, *evaluate your cooperating teacher's teaching performance, develop and present a program/presentation on agricultural awareness*, and *prepare a bulletin board (traditional or electronic) for teaching/learning or motivation* as relevant.

Planning instruction construct (*GM* = 2.58, *SD* = 0.48) activities associated with the student teaching experience focused on collecting/reviewing documents and reviewing classroom procedures. University supervisors considered all but two *planning instruction* activities as very relevant. However, respondents identified *inventory and evaluate references and instructional aids in the school and community* and *review articulations/other agreements between the Agricultural Education program and post-secondary program(s)* as relevant.

T*eaching profession* construct (*GM* = 2.57, *SD* = 0.45) activities focused on the inner-workings of professional organizations and participation in professional development. University supervisors considered all but two teaching profession activities very relevant. Two activities were considered relevant: *meet with the local educators' association representative* and *serve on a faculty/staff committee and serve on a faculty/staff committee*.

School–community relations construct (*GM* = 2.57, *SD* = 0.45) activities focused on providing visibility for an agricultural education program. University supervisors considered nine of 14 school–community relations activities very relevant. The five activities identified as relevant included: *visit other rural and/or agricultural businesses in the community, visit the county Extension office to gather information about agriculture in the community*, *visit with agribusiness leaders about the local agriculture program*, *visit with other community leaders about the local agriculture program*, and *trade student teaching responsibilities with a student teacher in another school*.

A*dult education* construct (*GM* = 1.97, *SD* = 0.70) activities focused on promoting formally-sponsored agricultural education programs with adult learners. Respondents considered all adult learning activities relevant.

Conclusions/Implications/Recommendations

This study sought to determine the extent university supervisors deemed traditional student teaching activities relevant as part of the preservice student teaching experience. University supervisors identified seven construct areas as being very relevant and one area as relevant in the student teaching experience. We conclude that university supervisors in the North Central Region of AAAE perceive activities and skills commonly required of student teachers are important to the capstone student teaching experience.

All five of the individual *evaluation of student performance* construct ($GM = 2.94$, $SD = 0.20$) activities were rated as very relevant by university supervisors in this study. Individual activities related to developing formative and summative student assessments/grading rubrics, explaining methods for evaluating student performance, utilizing grading systems consistent with cooperating teacher expectations, and reviewing evaluation instruments with the cooperating teacher comprised this construct. As the highest rated construct area in this study, findings aligned with a common need reported by Krysher, Robinson, Montgomery, & Edwards (2012)—student teachers struggle with assessing student learning. It is refreshing to see that university supervisors value the *evaluation of student performance* as it suggests a transition from a focus on teaching practices to more attention to student learning (Stripling, Thoron, & Estepp, 2014).

The only other area in this study in which respondents identified all individual activities as very relevant was the SAE construct. At times seen as unimportant (Robinson & Haynes, 2011; Young & Edwards, 2006), SAE-related activities implemented in the student teaching experience can help to fill the "gap between what is taught in pre-service programs and what is [eventually] implemented" (Rubenstein, Thoron, & Estepp, 2014, p. 81) in school-based agricultural education programs.

Although limitations are evident, results from this study identify activities which university supervisors believe most relevant in the student teaching experience as they support preservice teacher knowledge in context (Sticht, 1975). Additional relevant skills should be identified from the literature and compared to triangulate perspectives of the student teaching triadic stakeholders (Valencia et al., 2009).

Implications for teacher education programs based upon the conclusions of this study are evident. Teacher preparation program improvements should continue to be made in the area of field experiences (Latham & Vogt, 2007; Retallick & Miller, 2007). Results from this and related studies can be used as a benchmark for determining student teaching requirements in agricultural education programs. Future research should seek to continue to improve the capstone student teaching experience as a critical component of the teacher education program.

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School Culture Influences on Beginning Agriculture Teachers' Satisfaction and Efficacy

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Introduction

A nation-wide agriculture teacher shortage exists; this is not a new problem, but a persistent one (Kantrovich, 2007). One possible contributor to this growing problem is the lack of belonging some agriculture teachers feel to the school they teach in, or a poor school culture (Clark, Kelsey, & Brown, 2014; DeLay & Washburn, 2013). Further, Boone and Boone (2009) identified relationships with fellow teachers as a problem faced by agriculture teachers. Boyd (1992) views school culture as the interplay among three factors: the attitudes and beliefs of persons inside the school and the external environment; the cultural norms of the school; and the relationships between persons within the school. She asserts that any of these factors could serve as a barrier to change within a school or prevent long-term improvement.

Conceptual Framework

A substantive theory with conceptual framework (Figure 1) was developed connecting various aspects of school culture to teachers' job satisfaction and teacher self-efficacy. Five aspects of school culture for the success of teachers in the classroom emerged from the review of literature. First, *support from school and district administrators* (treated as two variables – school and district) has been shown to impact teachers' sense of worth in their school (Brunetti, 2006; Gu & Day, 2007; Morris, 2006). Lack of administrative support is a common problem facing teachers and the most frequently cited reason for attrition (Boone & Boone, 2007; Walker, Garton, & Kitchel, 2004).

Positive *relationships between colleagues* have been shown to play a role in motivating teachers (Brunetti, 2006; Gu & Day, 2007). In a study of mid-career teachers, DeLay and Washburn (2013) found that collaboration between peers increased job satisfaction. Boone and Boone (2007) found faculty relationships to be a moderate problem beginning teachers face.

Community support, or lack thereof, can also affect a teacher's perception of the culture of their school. Irate parents were frequently cited as an issue with both urban and rural teachers (Castro, Kelly, & Shih, 2010). Building parental and community support was shown to be one of the biggest job challenges for agriculture teachers in a study of outstanding young agriculture teachers (Mundt & Connors, 1999).

Being provided *proper facilities and an adequate budget* to maintain those facilities by their school have also been espoused as important specifically to agriculture teachers (Boone & Boone, 2009; Brunetti, 2001; Morris, 2006). If these spaces and finances are not provided satisfactorily, it is cited as a negative aspect of agriculture teachers' jobs (Mundt & Connors, 1999; Torres, Lawver, & Lambert, 2008). Additionally, Morris (2006) found personal benefits

provided by the school (salary, retirement benefits, health insurance) of career and technical education teachers in Georgia impacted their desire to remain in their profession.

These school culture variables have been linked with outcomes such as job satisfaction. *Job satisfaction* in agricultural education has been studied thoroughly, but not in this context. In general, agriculture teachers are satisfied with their jobs (Bowen, 1981; Kitchel, et al., 2012; Tippens, et al., 2013). Compensation, working conditions, employment factors, and family and personal factors have all been shown to impact job satisfaction, which, in turn, affects teacher retention and persistence (Tippens et al., 2013).

We also posit from the literature that if the school culture is a barrier for teachers, their self-efficacy is at risk. Self-efficacy is the extent to which one believes they can complete a certain task or reach goals (Bandura, 1997). For teachers, this means the extent they feel competent to complete their duties as a classroom instructor. McKim and Velez (2015) discovered that components of teachers' self-efficacy can help predict career commitment in early career teachers. This is consistent with research by Blackburn and Robinson (2008) who found that a significant relationship exists between agriculture teachers' sense of efficacy and job satisfaction.

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Perceived
Administrative
Support

Boone & Boone, 2007
Brunetti, 2006
Gu & Day, 2007
Walker, Garton, &
Kitchel, 2004

Perceived
Colleague
Support

Blackburn & Robinson,
2008
Brunetti, 2006
Gu & Day, 2007
Torres, Lawver, & Lambert,
2008

Perceived
Parental
Support

Mundt & Connors, 1999
Tait, 2008

Perceived
Financial
Support

Boone & Boone,
2009
Brunetti, 2001
Morris, 2006
Mundt & Conors,
1999
Torres, Lawver, &
Lambert 2008

Perceived Teacher Self-
Efficacy
and
Teacher Job
Satisfaction
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Figure 1. Conceptual model for this study.

Purpose and Objectives

The purpose of this study, which aligns with Priority #5 of the National Research Agenda: Efficient and Effective Agricultural Education Programs (Doerfert, 2011), was to examine how aspects of school culture explained levels of teacher self-efficacy and job satisfaction in early career teachers. The objectives were:

1. Describe perceived levels of school culture (district and school administrative, colleague, parental, and financial support), teacher self-efficacy, and job satisfaction;
2. Determine if a model exists explaining a significant proportion of the variance in teacher self-efficacy as explained by school culture;

3. Determine if a model exists explaining a significant proportion of the variance in teacher job satisfaction as explained by school culture.

Methodology

For this relational study, the population was first and second year agriculture teachers in Kentucky, Missouri, and Wisconsin. A list of individuals (N=171) was obtained from state supervisors, and a time and place sample was utilized (Oliver & Hinkle, 1982). The average participant was 25.8 years old (SD=5.14). A majority of them are traditionally certified (84.8%) and are female (67.0%).

A questionnaire was assembled. The school culture constructs were developed by the researchers to examine district administrator (e.g. superintendent), school administrator (e.g. principal), school colleagues, parental, and financial support. The items were measured on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). Teacher self-efficacy was measured using the Ohio State Teacher Efficacy Scale, which used a Likert scale (1 = strongly disagree; 6 = strongly agree) (Woolfolk & Hoy, 1990). The third section used a single 7-point Likert scale item (1 = strongly dissatisfied; 7 = strongly satisfied) to determine teacher job satisfaction, which has shown to be as reliable as constructs (Kitchel et al., 2012).

Reliability was established by conducting a pilot test of the school culture and supports instrument on third through fifth year agriculture teachers (N=15) in Kentucky, Missouri, and Wisconsin. Cronbach's alpha was calculated using SPSS on the five major constructs to estimate the reliability. All constructs were found to have scores ranging from .85-.90, with the exception of budget and facilities, which had an estimate of .64. However, a *posthoc* estimate for the budget and facilities construct had a score of .73. Face and content validity was established using a panel of experts.

Data were collected starting with an initial contact leading to five follow-up emails. A response rate of 53.8% (N=92) was achieved. Thirteen non-responders were contacted via telephone to participate in the study. A Mann-Whitney U was calculated to determine if there were any statistical differences between non-responders and responders. Out of the eight major constructs tested, only one (teacher efficacy, a subscale of teacher self efficacy) indicated a difference. The researchers combined responders and non-responders, but note there could be non-respondent issues regarding the teacher efficacy sub-scale.

Means scores, standard deviations, and factor analysis were calculated for objective 1. According to Woolfolk and Hoy (1990) factor analysis is an appropriate to determine constructs for each administration of their instrument; as such, we have three sub-scales noted in the Findings. Because of the exploratory nature of the framework, objectives 2 and 3 were calculated using stepwise multiple regression analyses. The alpha level of .05 was established *a priori.* A collinearity diagnostic was examined and it was determined there were no multi-collinearity issues.

Findings

Objective 1 sought to describe the variables of interest (see Table 1). The mean scores for four of the school culture variables were higher than 3.5 on a 5-point scale. Similarly, the three

sub-scales from the Teachers' Efficacy Scale (TES) indicated mean scores between 3.69 and 4.21 on a 6-point scale. Moreover, these teachers are also generally satisfied with their job ($M = 4.74$; $SD = 1.47$).

Table 1

Means and Standard Deviations for School Culture Supports, Teacher Self-Efficacy, and Job Satisfaction

	Mean	Standard Deviation
School Culture Supports (SCS) Instrument		
Facilities and Budget	3.19	1.02
District Administration	3.63	1.02
Parents and Guardians	3.85	0.89
Colleagues	3.96	0.97
School Administration	4.03	1.07
Teacher Efficacy Scale (TES) Instrument		
Teacher Efficacy	3.69	0.76
Personal Efficacy	3.97	0.69
Personal Efficacy Influence on Students	4.21	0.62
Overall Job Satisfaction	4.74	1.47

Note: SCS Scale: 1=Strongly Disagree, 5=Strongly Agree; TES Scale: 1=Strongly Disagree, 6=Strongly Agree; Job Satisfaction Scale: 1=Strongly Dissatisfied, 7=Strongly Satisfied

Objective 2 sought to determine if a model exists explaining a significant portion of the variability in beginning teachers' teacher self-efficacy as measured by school culture. Three analyses were conducted for each of the teacher self-efficacy sub-scales. The analysis for Personal Efficacy resulted in a statistically significant model ($p=.01$), which only included district administrative support explaining 6.8% of the variance in one's Personal Efficacy (see Table 2). For the sub-scale Influence on Students, the analysis resulted in a statistically significant model ($p=.02$), which only included school administrative support explaining 7.4% of the variance of one's Influence on Students component of teacher self-efficacy (see Table 3). The third analysis for Teaching Efficacy did not result in a statistically significant model.

Table 2

Stepwise Multiple Regression Analysis of School Culture Support on Personal Efficacy

Variable	β	Std. Error	t	p
District Administration	.19	.06	2.89	.005

Note: R^2 *Adj.* = .068

Table 3

Stepwise Multiple Regression Analysis of School Culture Support on Influence on Students

Variable	β	Std. Error	t	p
School Administration	.14	.06	2.39	.019

Note: R^2 *Adj.* = .074

Objective 3 sought to determine if a model exists explaining a significant portion of the variability in beginning teachers' job satisfaction as explained by school culture (see Table 4). The analysis resulted in four steps. In the first step, School Administration accounted for 49.3% of the variance in job satisfaction. In the second step, School Administration and Colleague Support explained 58.8% of the variance in job satisfaction. In step three, the addition of District Administration accounted for 62.6% of the variance in teacher job satisfaction. In the final step, School Administration, Colleague Support, District Administration, and Financial support constructs explained 64.3% of the variance of teacher job satisfaction.

Table 4

Stepwise Multiple Regression Analysis of to School Culture Support on Job Satisfaction

Variable	β	Std. Error	t	p
Step 4				
School Administration	.54	.11	4.98	.000
Colleague	.50	.10	5.04	.000
District Administration	.35	.11	3.31	.001
Financial	.22	.09	2.39	.019

Note: Step 1 $R_{adj}^2=.493$; Step 2 $R_{adj}^2=.588$; Step 3 $R_{adj}^2=.626$; Step 4 $R_{adj}^2=.643$

Discussion

The study has several limitations. First only beginning agriculture teachers in Kentucky, Missouri, and Wisconsin participated. While insight into specific states is important, it does not provide generalizable findings about novice teachers on a national scale. Secondly, caution should be used were considering non-responders in regards to the teacher efficacy sub-scale.

For this abstract format, we have opted to focus on the relational objectives (2-3). It was concluded that district administration (e.g. superintendent) has an influence over beginning agriculture teachers' Personal Efficacy, which is consistent with previous studies (Brunetti, 2006; Gu & Day, 2007; Morris, 2006), while the school administrative support (e.g. principal) influences Personal Efficacy on Students. However, no factors emerged as influential in regards to Teaching Efficacy. Teacher educators should work with preservice teachers and state staff should work with beginning teachers on how to develop positive relationships with administrators. In addition, communication materials (e.g. infographics) should be accessible to beginning teachers to share the value of the agricultural education program.

It was concluded perceived school administration, colleague support, district administration, and financial support all had influence on novice teacher job satisfaction, which is consistent with literature (Boone & Boone, 2009; Brunetti, 2006; Foor & Cano, 2011; Gu & Day, 2007; Morris, 2006; Mundt & Connors, 1999; Torres, Lawver, & Lambert, 2008). It is not just relationships with students that early career agriculture teachers need to build; relationships with administrators and colleagues are particularly influential on beginning agriculture teachers' job satisfaction. This further strengthens our argument for relationship building training and communication tools.

Additional research should be conducted to explore the beginning agriculture teachers and their relationships with their school administrators. Further qualitative questions to be explored include determining how beginning teachers struggle with their administrator relationships and cases of how more experienced teachers have mastered relationship building with administrators.

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What Do We See, What Do They Say?
A Collective Case Study of Instructional and Coaching Behaviors When Preparing Career Development Event Teams

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Introduction

Currently, the National FFA Organization offers 24 individual and team Career Development Events (CDE) (National FFA Organization, 2015), meant to be an application of classroom learning, "in a context that is closer to real life than that of the classroom" (Phipps, Osborne, Dyer, & Ball, 2008, p. 407) and to develop youth as leaders, team members, and gracious winners/losers through the CDE competitions. Phipps et al. (2008) argued, "the competition of a CDE makes learning fun…and…when students are having fun, yet experiencing a felt need to learn, motivation to learn increases and leadership skills develop" (p 407).

Research on CDE preparation has indicated teachers employ strategies for preparing CDE teams similar to strategies for teaching. Strategies identified in prior research include: considering learning styles as a part of preparation (Poskey, Igo, & Waliczek, 2003): internal and external mechanisms for motivation (Ball, Bowling, & Bird, 2015; Russell, Robinson, & Kelsey, 2009); positive feedback, social support, training/instruction, and situational consideration (Falk, Masser, & Palmer, 2014); and friendship, confidence, enthusiasm, team spirit, and cooperation (Bowling & Torres, 2010). These strategies align with teaching strategies as well as with strategies identified in the athletics literature as coaching strategies. Research has attempted to articulate how teachers prepare CDE teams, yet most has been self-reported perceptions of effective CDE preparation, or specific to a singular teacher or type of CDE. Research in education and in athletics has a history of codifying both effective teaching and coaching behaviors. Given that CDEs by design appear to be a blend of both teaching (application of classroom learning), and coaching (embedded within competitive events), there is a need to explore and codify the nature of CDE preparation and subsequent strategies or behaviors in which teachers engage while preparing teams (Ball et al, 2015). The research provided in this study is not meant to argue whether or not teachers should prepare CDE teams. Given that CDEs are of significant importance to school-based agricultural education, research is warranted to explore how teachers prepare teams through observing what they do and listening to what they say during team preparation sessions.

Conceptual Framework

The conceptual framework was guided by substantive literature intersecting behavioral strategies for teaching and coaching. In athletics and coaching where performance related skills are developed, research indicates that coaches' use both coaching and teaching strategies to increase athletic performance (See Figure 1). Cote & Gilbert (2009) define an effective coach as, "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes competence, connection, and character is specific coaching

contexts" (p. 316). Further, Drewe (2000) discussed the importance of coaches as teachers when the sport requires the acquisition of practical knowledge. Additionally, Gallimore & Tharp (2004) found Coach John Wooden planned his teaching moments: to the specific words he used, goals he gave his team and individuals, and the precise moments he wanted to teach his basketball curriculum. Further, Bloom, Crumpton, & Anderson (1999) found previously successful coaches used instruction and technical instruction when preparing their teams to compete.
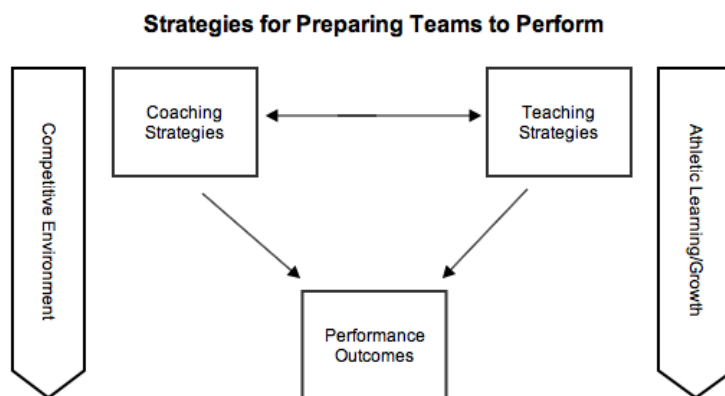
Figure 1. Strategies for Preparing Teams to Perform

Purpose

The purpose of this study was to observe and identify the behaviors and discourse used by agricultural teachers who have had success at state CDE competitions when preparing CDE teams. This study was guided by the following research questions:

1. What observed behaviors do teachers preparing CDE teams use?
2. What patterns exist among observed teacher behaviors for preparing CDE teams?

Methods

The present study is a part of a larger grounded theory collective case study. For the sake of the abstract length requirements this abstract will report the classroom discourse portion of the data for the grounded theory collective case (Yin, 2009). A subsequent abstract will report the interview and artifact data. The participants for the study were 7 high school agriculture teachers who were purposefully selected based on their previous CDE team success. The selection criteria included that they all had a top three placing team at the state competition the previous year and met all of the performance indicators of total program quality (classroom, FFA, and SAE) in school-based agricultural education in Missouri.

For the larger grounded theory collective case study, three data sources, interviews, artifacts from CDE teams, and classroom discourse analysis were used. The primary data source for this abstract occurred through observations of teacher behavior and discourse while preparing CDE teams utilizing the Career Development Event Preparation instrument. The instrument was

developed through a previous qualitative case study which investigated an exemplarily CDE teacher through a 16-week intensive set of interviews and field observations. Data were coded and the major themes were transformed to an instrument that identified specific teacher behaviors and discourse for preparing a CDE team. The instrument was then field-tested through a collective case study (consisting of two observations and one interview each) of 3 teachers, and adjustments were made from the findings of those typical cases. Teachers also reviewed the instrument and gave general feedback on the items as a valid representation of how they tend to conduct CDE preparation sessions. The final Career Development Event Preparation instrument comprised three sections: coaching, instructional, and negative behaviors. Coaching behaviors related to motivation, positive reinforcement, goal setting, sportsmanship, and statistical analysis. Instructional behaviors related to staying on task, providing practical simulations, memory tools, visuals, examples, and directions, encouraging discussion and questions, questioning strategies, and peer teaching. Negative behaviors related to negative feedback, use of sarcasm, reprimands, negative non-verbal cues, and criticism. Researchers used the instrument to log frequency counts of the observed behaviors during 5-minute increments within the 60-minute CDE practice sessions. Two researchers utilized the observational instrument to conduct one on-site 60-minute observation per participant, for a total of 8 observations during the spring in which teams were preparing for district CDE competitions. Additionally, two teachers provided either an additional one or two-videotaped practice sessions as their teams prepared for the state CDE competition. A total of 11 observations were analyzed.

To establish validity of the classroom discourse instrument this study utilized a panel of experts, who were also previously successful CDE coaches not selected for the study to determine if the instrument would capture what it intended. The researchers normed the construct and individual item definitions, frequency count process for a new behavior, and frequency count process for constantly occurring behaviors. Inter-rater reliability was established by observing and discussing a videotaped recording of a CDE practice and conducting simultaneous observations to cross-check each individuals' interpretation of the observed behaviors. After all on site observations were conducted the researchers re-checked their observations to ensure they remained consistent through time. The inter-rater reliability scores for the instrument were coaching behaviors 71%, instructional behaviors 84%, and negative behaviors 100%. Finally, intra-rater reliability was established by each researcher conducting multiple observations and then cross-checking each observation for internal consistency.

The researchers used multiple approaches to ensure the trustworthiness of the study (Lincoln & Guba, 1985). Credibility was upheld by triangulating the data, prolonged engagement in the field, member checking, and saturation of the data. CDE artifact data was collected and analyzed to triangulate with the classroom discourse and observation data. Dependability and confirmability were upheld through triangulation of data sources, comparison of emerging themes and subthemes, peer reviews, and maintaining a continuous coding audit trail for the larger study. The findings reported in this abstract, however only include the frequency counts and percentages of observed classroom discourse and CDE preparation behaviors.

Findings

Research question one described the behaviors that are used by typical agricultural teachers who have had success at state CDE competitions. To describe the behaviors used frequency and percentage of time were reported (see Table 1). The frequency of coaching behaviors used in the 11 classroom observations was 2 to 114 instances, and the percent time used for coaching behaviors ranged from 2.99% to 23.90%. The frequency of instructional behaviors observed was 65 to 390 occurrences, and the percent time observed for instructional behaviors ranged from 73.38% to 97.01%. The frequency of negative behaviors observed was 0 to 18 instances, and the percent time observed for negative behaviors ranged from 0.00% to 7.59%. For all 11 observations, instructional behaviors were the most observed, followed by coaching behaviors, and negative behaviors.

Table 1

Frequency and Perfect of Time Used When Preparing Career Development Event Teams

Observation	Coaching Behaviors		Instructional Behaviors		Negative Behaviors	
	f	%	f	%	f	%
1	27	11.16%	205	85.71%	10	4.13%
2	13	4.32%	278	92.36%	10	3.32%
3	35	12.28%	248	87.02%	2	0.70%
4	16	14.55%	88	80.00%	6	5.45%
5	34	8.99%	336	88.89%	8	2.12%
6	114	23.90%	350	73.38%	13	2.72%
7	50	13.81%	311	85.92%	1	0.27%
8	49	10.96%	390	87.25%	8	1.79%
9	2	2.99%	65	97.01%	0	0.00%
10	46	11.95%	327	84.94%	12	3.11%
11	18	7.59%	201	84.82%	18	7.59%
Total	404	12.28%	2799	85.05%	88	2.67%

Research question two investigated the patterns of observed behaviors among school-based agriculture teachers who have had success at state CDE competitions. To determine observed patterns a hierarchical cluster analysis was performed based on the frequency of observed behaviors (see Figure 2). One cluster emerged with a coefficient of 3.00 and encompassed all 12-time periods of the instructional behaviors. No patterns emerged among the coaching or negative behaviors.
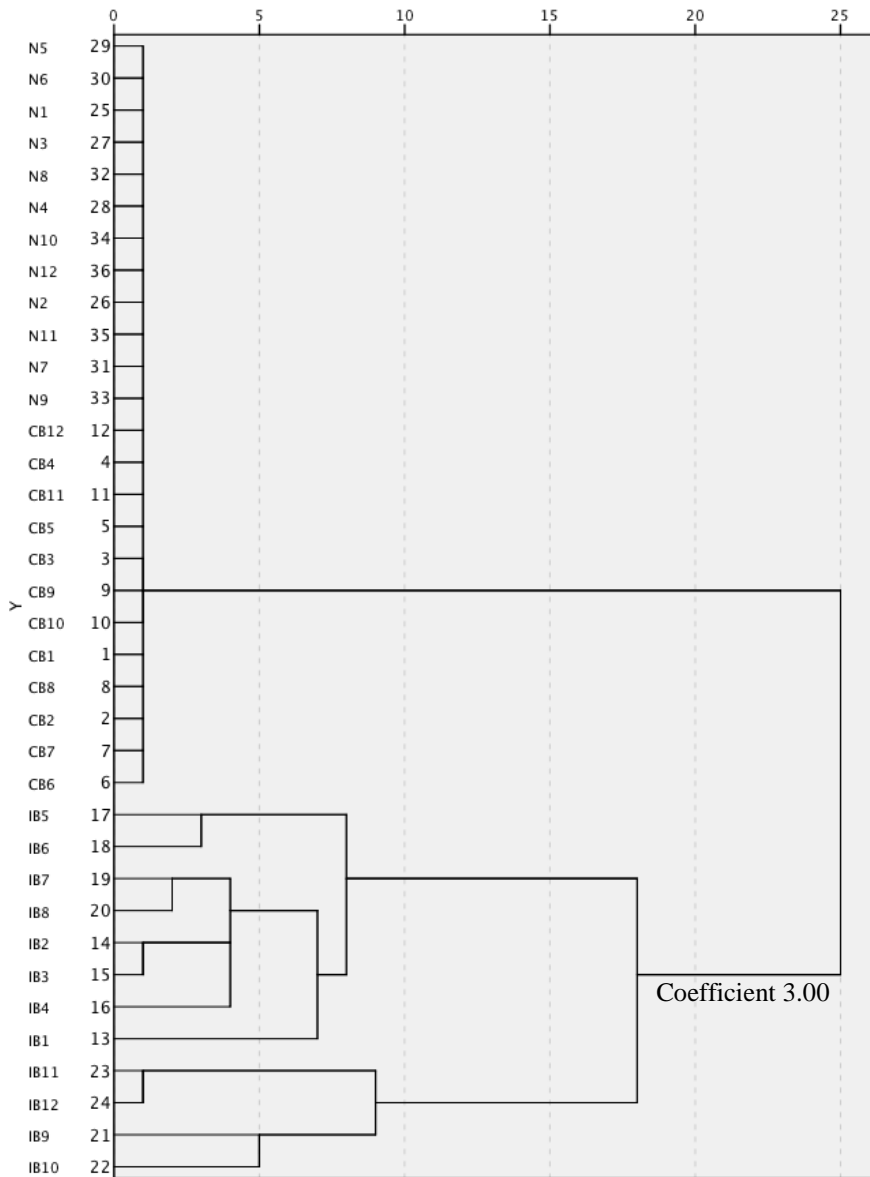
Figure 2. Dendrogram for CDE Preparation Behavioral Patterns

Conclusions/Implications/Recommendations

For question one it was concluded that the frequency of use and time dedicated to each type of behavior varied among all teachers. It was also concluded that when preparing CDEs, the majority of time the teachers spend was dedicated to instructional behaviors. Although, to a much lesser degree all teachers were observed using coaching behaviors. From the findings it can be implied that, teachers in this study felt instructional behaviors provided the greatest opportunity for their students to be successful by the amount of time dedicated to these during practice, which is consistent with coaching literature (Bloom et al., 1999; Cote & Gilbert, 2009; Drewe, 2000; Gallimore & Tharp, 2004). It can also be implied that teachers use coaching

behaviors in more varying contexts potentially due to an individual teacher's preferences, students' needs, students' interest level, or previous student CDE experience/success.

For question two it was concluded that instructional strategies were consistently used and thus an observed pattern by all teachers for CDE preparation. The findings imply that patterns of behavior, beyond strategies that are instructional in nature, are more teacher-specific and potentially more CDE specific. Unlike athletic coaching strategies, which are tightly linked to motivation and team development (Cote & Gilbert, 2009), the CDE preparation strategies observed in this study appear not to translate that same linkage. Perhaps teachers preparing CDE teams have built relationships, motivated students, and developed teams more consistently and in ways that transcend CDE practices, and thus utilize more instructional kinds of strategies during practice time.

Teachers should utilize the results from the study to reflect on the behaviors and discourse they utilize when preparing teams to denote a structured pattern or set of strategies for their practice and then utilize the information to better structure what they would like to accomplish during practices. Teacher educators and professional development staff should begin conversations with teachers regarding the way in which they structure practices, how practice time is utilized, and if what they "say" or "believe" is effective for effective CDE preparation actually matches how they are observed and what they say while preparing teams. Further research on CDE preparation needs to be conducted to more clearly codify effective CDE preparation behaviors and to determine the specific behaviors that have the largest implications for student performance. Finally, additional studies should be conducted to determine if the findings from this collective case study hold true to a larger sample.

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Conceptualizing the Process of CDE Preparation: A Grounded Theory Approach

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Introduction

Literature in athletic coaching has determined that teaching and coaching are one and the same. Cote & Gilbert (2009) define an effective coach as, "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes competence, connection, and character in specific coaching contexts" (p. 316). Research has indicated that coaches fulfill the role of a teacher when the sport requires practical knowledge (Drewe, 2000). Coaches have been reported to use instruction and technical training when preparing their teams (Bloom, Crumpton, & Anderson, 1999), for example Coach John Wooden planned when he wanted to teach specific basketball curriculum (Gallimore & Tharp, 2004).

Career Development Events (CDEs) mirror athletics, in the sense that they are competitive events. In addition to the benefits of competition, CDEs enjoy the benefits of a direct curricular connection because students have the ability to apply what is learned in the classroom to expand their content knowledge and develop as individuals (Phipps, Osborne, Dyer, & Ball, 2008). In this regard, CDEs can give students the best of what athletics and academics have to offer. CDE participants echo this in the literature denoting that they perceive CDEs to be beneficial (Jones, Knobloch, Orvis, & Esters, 2012) and that participating in CDEs develops leadership and life skills (Russell, Robinsin, & Kelsey, 2009). Teachers perceive CDEs as integral to a total school-based agricultural education (SBAE) program, and have indicated a felt need for professional development related to CDEs (Torres, Ulmer, & Aschenbrener, 2008). Thus, as the literature outlines, CDEs are an important and beneficial component of the comprehensive model for SBAE. Given such importance, research is warranted and has begun to explore the strategies teachers' employ for preparing CDE teams.

CDEs by design appear to be a blend of both teaching (application of classroom learning), and coaching (embedded within competitive events). As such, there is a need to explore and codify the nature of CDE preparation and subsequent strategies or behaviors in which teachers engage while preparing teams (Ball, Bowling, & Bird, 2015). The research provided in this study is not meant to argue whether or not teachers *should* prepare CDE teams, but rather *investigate the action or process of preparing teams* and ultimately codify this wisdom of practice. Previous research on strategies for CDE preparation appear to substantively group into instructional or teaching strategies, and motivational/relational or coaching strategies. Regarding instructional strategies, agriculture teachers aim to create self directed learners in the content area (Ball et al., 2015), use positive feedback and training and instruction (Falk, Masser, & Palmer, 2014), build the foundational knowledge of the students (Voight, Talbert, McKinley, & Brady, 2013), focus on the learning styles of the students (Poskey, Igo, & Waliczek, 2003), and use educational conditioning and skill development (Bowling & Torres, 2010). Research on motivational/relational or coaching strategies for CDE preparation indicates that teachers utilized both external and internal motivation within a competitive environment (Ball et al., 2015), social support and situational consideration (Falk et al., 2014), expectations, goals, support, and a

positive environment (Voight et al., 2013), and alertness, friendship, intentness, competitive greatness, cooperation, and initiative (Bowling & Torres, 2010). While a great beginning, most of the current research in CDE preparation has been entirely perceptual in nature, self-reported, or specific to singular teachers or singular CDEs.

Findings from both athletic and agricultural education research seems to indicate a potpourri of strategies, mantras, and generalizations for preparing teams which reside in motivation and instruction, yet doesn't seem to dial specifically down to the action or process of preparing a team. Further, while broad findings such as "relationship building" and "positive feedback" are a helpful start, they do little to provide current and aspiring teachers with ways to enact said behaviors. According to Creswell (2013) the aim of grounded theory is to describe a process or an action from the vantage point of the individuals who engage in it, generate a theoretical model from the data, and fulfill a specific theory-practice gap. This current study is an initial attempt to fill the theory-practice gap in CDE preparation.

Purpose

The purpose of this grounded theory collective case study was to identify the behaviors and strategies used by agriculture teachers when preparing for Career Development Events. This study was guided by the central question: What is the process for preparing CDE teams?

Methods

The present study is part of a larger grounded theory case study utilizing both interviews and classroom discourse analysis. For the sake of the abstract requirements this abstract will report the interview portion of the data for the grounded theory case design (Yin, 2009). A subsequent abstract will report the classroom discourse and observational analysis data. The participants were seven high school agriculture teachers purposefully selected based on their previous CDE team success, including: at least one top three placing team at the state competition the previous year and meeting performance indicators of total program quality (classroom, FFA, and SAE) in SBAE programs in Missouri.

The primary data sources for the study included: interviews, artifacts utilized in developing CDE teams and noted classroom discourse from a series of field observations of teachers working with teams. Interviews were conducted on-site following CDE team practices and utilized semi-structured questions focusing on: practice structure, student and team motivation, goal setting, practice strategies, learning strategies, and teacher roles. All interviews were audio recorded and transcribed verbatim. Artifacts from CDEs such as tests, guidebooks, etc. were a secondary data source to confirm and support the interview data. Finally, participants were observed during selected CDE preparation sessions and the frequency and nature of teacher discourse were recorded utilizing a previously developed observational instrument. Data from all sources were triangulated and open, axial, and selective (Strauss & Corbin, 1998) coding was performed utilizing a constant comparative analytic approach (Creswell, 2013). Categories were synthesized into emerging themes and a visual diagram of the emerging theory was developed.

Multiple approaches were used to ensure the trustworthiness of the study (Lincoln & Guba, 1985). Credibility was upheld by triangulating the data, prolonged researcher engagement in the field via multiple observations and interviews with teachers, member checking, and saturation of the data. To make the findings transferable thick, rich descriptions and a continuous audit trail was maintained. Dependability and confirmability were addressed through comparison of emerging themes and subthemes, and peer debriefing of the researchers throughout the analytic process.

Results

Interview data revealed three major themes that formed the central components of the model.   Teachers discussed the strategies they employ to prepare teams, the issues that intervene in said preparation, and the end goals and outcomes for students or reasons why they prepare teams in the first place (see Figure 1).

Per the interview and observational data, two categories (motivation and instruction) emerged to comprise the theme of teacher strategies. Teachers articulated employing specific motivational strategies such as building close relationships, building student confidence, providing feedback and knowledge of individual and team progress both positive and negative reinforcements as motivational tools, and strategically structuring teams with more than four individuals to enhance the nature of the competitive drive among team members. One teacher described building relationships and motivation as, "…but they know that you care, and that translates to them wanting to work hard for you, but also you're able to build the relationship and you're able to convince them that they need to work hard for themselves." For instructional strategies, teachers revealed that they chunked similar materials into basic bits of content, developed a progression of learning CDE content from rote memorization to higher level thinking throughout the season, carefully planned the learning experiences of each practice session, and were very task-oriented and efficient with the instructional time. One teacher summarized the process of learning CDE content by saying,

> Right now, they don't know what they don't know yet. So, I'm still at the point that I tell them what we are doing at practice, hopefully by the time we hit districts they are going to know what their strengths and weaknesses are.

The second theme in the central model included the notion of what teachers wanted students to receive from CDE participation or how they conceptualized success. While the teachers in this study were purposefully selected due to their success with attaining state and sometimes nationally ranking teams, interestingly, "success" or the reason why teachers prepared students for CDEs in the first place, transcended traditional notions of winning. Teachers overwhelmingly stated the purpose of CDEs was knowledge, skill, and personal development. Teachers wanted students to know they could achieve goals and experience competitive greatness, and to experience the joy and confidence that comes from being good at something. They wanted students to achieve friendships, make contacts and connections, and build relationships with other students. They also indicated that traveling, exploring and getting to expand themselves beyond their often limited backgrounds was a broader reason why they prepared students for CDEs. Regarding the outcomes that teachers desired for students as a result

of CDE participation one teacher said, "I never will tell a team that they have to win 'cause if it gets to that then I'm quitting. I'll find something else to do because that's not what it's about."

Regarding the final theme in the conceptual model for CDE preparation, several philosophical and context-specific issues intervened between the way teachers prepared teams and their desired outcomes for students. First, teachers noted that students often have time conflicts with sports, other extra-curricular activities and work that limit practice time. Instructional time must be negotiated and different teachers indicated that they overcome various limitations and develop ways they can intersect instructional and CDE practice time. Some teachers noted the need to overcome the negative connotation of CDE preparation with coaching, agriculture teachers "training" teams, and said training detracting from "real classroom teaching". Further teachers noted that it was an issue or limitation that CDE competitions, unlike athletics competitions are not public. Thus, parents and stakeholders such as school administrators often don't understand what students do and how they develop in CDEs and thus efforts often go unrecognized, unappreciated, and ultimately under supported in schools. Regarding the lack of visibility or recognition of CDE competitions one teacher said,

> ….sports teams got the edge to bring people to see it. Unless you have been a part of FFA you don't know what these kids do. And that is a sad deal, because even the parents don't fully understand what they do. And I don't know how you fix that…but I think that is going to be one of the hardest things FFA and ag has to do…is to bring that connection back into the school and show that.

Finally, teachers discussed the issue of success as a tradition. As teachers in SBAE programs with a history of success, they noted that while success as a tradition can motivate some students it can also intimidate others. Further, all of the teachers in this study mentioned that they had to start from the beginning as new teachers and in new programs, and that teachers in SBAE programs with limited success often battle building morale or success from an absence of tradition.

Teacher Strategies

Motivation

- Self-monitoring progress
- Feedback
- Goal-setting
- Relationship Building
- Strategic team structure

Instruction

- Progression of knowledge from rote to advanced
- Structuring content
- Chunking
- Developing metacognitive thinking
- Planning practices
- Task-oriented

Intervening Issues

- Instructional time conflicts
- Perception of coaching as antithetical to instruction
- Competitions are not public and unrecognized
- Succes as a tradition

Desired Student Outcomes

- Knowledge and skill development
- Achieving competitive greatness
- New growth experiences
- Experiencing success in an endeavor
- Friendships and connections with others

Figure 1. Process of Preparing CDE Teams

Conclusions/Implications/Recommendations

It was concluded that teacher strategies for preparing CDE teams is a simultaneous and cyclical balance of both instructional and motivational strategies depending upon individual students' and teams' progression through the learning experience. Teachers strived to develop students from unconfident or unmotivated toward highly confident and intrinsically driven to succeed at the event. This finding is consistent with prior literature on CDE preparation strategies (Ball et al., 2015). Instructionally, CDE preparation was articulated as a process of progressing novices in a content and CDE area to self-directed learners who know the metacognitive strategies in order to be successful in the event. While this finding is similar to athletics coaching literature that identified instructional strategies in coaching (Bloom et al.,

1999), the findings from this study pointed toward developing metacognition, and self-directed learning strategies that were not addressed in prior research. Also not addressed in prior research on CDE preparation, but revealed in this study were the contextual issues that seemingly intervene between *the how (strategies) and the why (desired outcomes)* for CDE preparation. Teachers noted that those issues should be taken into consideration and they must develop philosophies and strategies to combat those issues, based upon individual teaching and school situations. In particular the fact that while athletics are a performance event watched by an audience while CDEs are a performance event that go unnoticed and often unrecognized has important implications for SBAE.

Further research in CDE preparation should be conducted to determine if the conceptual model for CDE preparation is consistent with teachers who have not placed within the top three at state and within states where the competition structure differs. Research should also be conducted through the student lens, investigating motivation to participate and specific outcomes of participation. The results from this study should help form conversations and teacher development around effective practice in CDE preparation for beginning as well as experienced teachers. Teacher professional development should be conducted around articulating and measuring specific behaviors within the strategies outlined in this model to develop research-supported principles for effective practice. Finally, teachers and teacher educators should explore the underlying issues that intervene with CDE practice strategies and the desired outcomes that teachers have for students in order to tailor professional development to individual teaching contexts.

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Alternative Certification: A Solution or an Alternative Problem?

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Introduction

The need for qualified teachers to fill vacancies is an issue facing all areas of education (The National Academies, 2010). Research in teacher education indicates there are multiple pathways to certification, varying between states. While the literature indicates some teachers are more effective than others, given the diversity of certification pathways, lack of reporting, and lack of consistency between and among certification pathways, little evidence exists regarding the effectiveness of one particular pathway to teaching certification over another (The National Academies, 2010). Typical routes to certification as defined by the purposes of this philosophical paper, include: traditional certification-preparation through and completion of a professional educational teacher preparation program; and alternative certification-entering the profession through means other then a professional educationally based teacher preparation program, such as emergency certification, temporary certification, work-based programs, and structured university and/or private providers of alternatively labeled certification pathways (The National Academies, 2010). Alternative pathways to certification, in part, were created to fulfill a current (and historic) supply and demand issue for highly qualified teachers in agricultural education as well as many other discipline areas.

The National Agricultural Education Supply and Demand Study found of the 1,366 agricultural education openings across the nation 183 of these were filled with non-licensed individuals. Of these, 82 were from a traditional agricultural program, 26 from an education program, 22 unknown, 20 from the agricultural industry, 14 from other areas of education, and 9 graduated outside of an agricultural or education program (Foster, Lawver, & Smith, 2014). Additionally, they note that 86 full time and 10 part time positions were unfilled in September of 2014 and an additional 253 new positions were reported to open across the nation in 2015. Further, they found since 2011 an average of 67 positions were lost each year, primarily due to a deficit of qualified individuals to fulfill vacancies.

The state of Missouri over the past five years alone, had a total average of 84 vacancies per year, with an average of 12 positions unfilled or closed, and a five year total of 25 positions filled with individuals with either temporary or alternative certifications (R. D. Scheiderer, personal communication, June 1st, 2015). Of those total teachers, 23 still remain in agricultural education. Missouri is currently grappling with the issue of maintaining quality traditional pathways in teacher preparation, while providing solutions to alternative certification that simultaneously provide highly qualified agricultural educators to meet the state's teacher supply while not undermining the traditional teacher preparation programs and thereby opening a "back door" to the profession. One key to

solving this issue is articulating a clear philosophical stance on alternative certification, contextually immersed in the history of alternative certification in agricultural education, underscored with current research, and finally, outlining key philosophical premises' via interpretation of the literature.

Purpose and Objectives

The purpose of this philosophical paper is to articulate the driving force behind and the current use of alternative certification within agricultural education. The following objectives were constructed to fulfill this purpose:

1. Identify the historical presence of alternative certification within the empirical research in agricultural education.
2. Examine the current state of alternative certification within agriculture education.
3. Describe recommendations for future research and current practice regarding alternative certification within agricultural education.

Methods

The design of this study was philosophical in nature. A clear philosophy serves to establish common truths and principles that ultimately guide professional decisions and perspectives. Philosophical approaches to research are unlike typical social sciences research methods, and rather seek to argue a research-based set of perspectives (Burbules & Warnick, 2006). Philosophical methods include a thorough connection to the literature, a driving purpose, and a set of interpretations with the inclusion of multiple viewpoints (Burbules & Warnick, 2006). The researchers approached this philosophical paper through a pragmatist epistemological lens (Creswell, 2013), choosing to guide the research by a practical problem, and it's subsequent research-based solutions, within a discipline. The researchers focused a thorough review of the substantive literature toward the presence and influence of alternative certification within education and agricultural education. Peer debriefs and triangulation among the literature as well as selected practitioners was utilized to ensure credibility and trustworthiness.

Historical Presence of Alternative Certification Within Agricultural Education

By investigating the history of alternative certification within agricultural education a context for "what was" can be created. The teacher shortage issue is not new to agricultural education, making its first appearance only a few years after the passage of the Smith Hughes Act (Camp, Broyles, & Skelton, 2002). In the early years of Agricultural Education research, investigations on teacher certification mainly focused on teacher preparation and certification requirements (Loreen, 1960; Sutherland, 1962). It was not until a significant shortage of agricultural teachers occurred to cause an investigation into new pathways in teacher certification (Wiegers, 1966). This need to fill vacant teaching positions caused some divide within the profession on how to best fulfill this need.

In the beginning part of the search, many stakeholders held different opinions on how best to fulfill teacher supply requirements based on their varying concern for the learner, teacher, department, and/or profession (Weigers, 1966). If vacancies occurred, some felt it best to close the program rather then hire unqualified individuals and others felt it best to hire almost fully certified teachers (Weigers, 1966). If vacancies occurred mid-year, some felt a temporarily certified person could fill the opening until the end of the year, while others felt the position should remain open until a certified teacher could be hired (Weigers, 1966). The wide range of beliefs on teacher certification all became factors in the discussion on filling vacancies.

Into the late 1960's the agriculture teacher shortage continued and certification changes were adopted across the nation. Adjustments where made to course requirements or emphases within the teacher preparation program to increase interest in pursuing agricultural education majors (Barwick, 1967; Drawbaugh, 1968). Although program changes were employed, they still fell short of filling open positions. Within the state of Delaware, certification accommodations allowed people who had previously received a degree in agriculture and completed 12 hours of extended course work to receive certification (Barwick, 1967). In New Jersey, one-fourth of the agricultural teachers employed held emergency certification, due to the requirement to have two years of farm experience. This requirement was subsequently removed (Drawbaugh, 1968). New Jersey residents could also receive a teacher certificate through the trade, if they worked a paying job for 5 years and completed 18 credits of professional development courses, supervised teaching, and three years of successful teaching (p. 9). These were the first steps taken by the agricultural education profession to address the teacher shortage across the nation.

Historically, shortages of certified agricultural teachers caused potential teacher candidates and school districts to seek alternative certification methods. Although teacher shortages were documented well back into the 1960's, this is still an issue the profession faces today. As modern programs face historic issues of finding qualified teachers, they must consider the research regarding the outcomes of alternative certification in agricultural education to make evidence-based programmatic decisions. Over the past 30 years, research in agricultural education has investigated the performance, needs, and issues of alternatively certified teachers in agriculture.

Alternative Certification within Agriculture Education

Teacher education institutions serve a purpose for preparing future candidates for the complex roles assumed by agricultural teachers (Duncan & Ricketts, 2008; Talbert, Camp, & Camp, 1994). Research indicates that many alternatively certified agriculture teachers have been employed in other agricultural fields and thus possess practical agriculture experience but lack pedagogy and pedagogical content knowledge of traditionally certified teachers (Young & Edwards, 2006). On the positive side, the practical agriculture content knowledge of alternatively certified teachers most likely surpasses the normal first year teacher (Rocco & Washburn, 2006; Ruhland & Bremer,

2002); however, their lack of program and classroom teaching knowledge has potential negative effects on the quality of the total agriculture program (Dyer & Osborne, 1996). Further, it was found that the alternatively certified teacher had more issues with student discipline, lesson planning, and classroom/laboratory management (Talbert, Camp, & Camp, 1994).

Due to the influx of alternative certified teachers, appropriate training to fill content, pedagogy, and professional education gaps in the preparation of the alternatively certified teacher is warranted, and often accomplished, in part, through specific professional development programs geared toward alternatively certified teachers (Robinson, 2010). In the literature professional development for alternatively certified teachers has been shown to be effective (Duncan & Ricketts, 2008). Alternatively certified teachers perceived their highest professional development needs are related to changing curriculum to meet changing technology, and knowledge and skills regarding proficiency awards and career development events (Roberts & Dyer, 2004). Yet doubt has been cast whether an alternatively certified teacher has the professional knowledge to make valid decisions concerning their professional needs (Roberts & Dyer, 2004).

Interpretation of Current Research

Most alternative certified teachers are found to possess abundant technical skill within their discipline, but lacking in the basic needs found necessary to operate effectively in the classroom. By not participating in traditional teacher education programs, alternatively certified teachers appear to be at a distinct disadvantage when measuring selected pedagogical and program management skills. Some evidence shows that both traditionally certified first year teachers and alternatively certified teachers' needs are similar through their requests for professional development. However, it is difficult to know if an alternatively certified teacher is knowledgeable enough on the culture and cannons of the profession to truly understand their needs. In addition to professional development that provides basic pedagogy and program management, alternative certification programs in agricultural education should also consider programming that develops a community of practice within these teachers that connects them to the larger teaching community and professional culture within agricultural education. Given the lack of awareness about their knowledge gaps among new alternatively certified teachers, programs that immerse those teachers into the cannons of discipline are warranted.

States still have a great demand for qualified agriculture teachers, and the literature has indicated that many alternatively certified teachers bring an abundance of technical agriculture skills to the classroom. Agricultural teacher educators and state staff members should consider developing a more focused model of recruiting late-career individuals into teaching through alternative pathways to certification. A proactive approach whereby individuals with a wealth of experience, maturity, and success within other agricultural careers, who may be looking to rejuvenate themselves via a mid-life career change, should be considered as primary targets for alternative certification.

Finally, given the current issues even seen in traditional pathways to certification including increasing policies, higher standards, a shortage of individuals interested in teaching, job related stress, increased demands, and budget cuts causing teacher retention problems upon entering the profession, states should consider developing collaborative, statewide models for alternative certification. As traditional pathways in some states become more difficult to pursue, states face the inherent danger of alternative pathways as a "back door" to a less rigorous route to certification, thereby undermining traditional teacher education programs. States should use the research and its subsequent interpretations presented in this paper to develop agreed upon standards and policies for alternative certification and to create a collaborative model among institutions to increase the capacity to certify alternative teachers in a high quality, yet attainable manner.

Recommendations

Based upon the empirical review laid out by this study, it is determined much more research on alternative certification is warranted. Studies need to be conducted to better understand the current state of alternative certification programs within agricultural education. Research should be conducted to investigate the reasons individuals would seek alternative certification beyond the traditional university based route and uncover barriers to entry into traditional programs. Finally, research needs to be conducted on different alterative certification programs to determine the most effective alternative certification pathway. Beyond investigating alternative certification as a process, studies need to explore the effects alternatively certified teachers have on student learning and agricultural education program outcomes.

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Assessment of Middle School Agricultural Education Experiences Related to High School Agricultural Education Enrollment in Georgia

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Introduction

Middle school agricultural education programs provide students with a variety of outlets to put their knowledge to the test, combining agricultural concepts learned in the classroom with academic content. Currently agricultural education is only serving a fraction of the students who have the ability to be part of an educational program of this capacity (Myers, Dyer, & Breja, 2003). However, according to Hillison (1994) "in recent years, the middle/junior high school program has become a popular one and represents the fastest growing area of agricultural education" (p.4). This increase should motivate teachers and educational researchers to discover the experiences at the middle school level leading to high school enrollment, thus establishing an increase in the number of students who will benefit from agricultural education. Cupp and Weaver (1994) and Herren and Denham (1990) identified factors in the recruiting and retention of students within high school programs. The need for increasing enrollments in school-based agricultural education is among the priorities of the agricultural education profession (Doerfert, 2011).

Theoretical Framework

This study is based on cognitive and social psychology, involvement, and experiential learning theories. Cognitive and social psychology supports the link between student attitudes and beliefs (Bandura, 1986; Vygotsky, 1962) that could result in student enrollment in agricultural education programs. These foundations depict knowledge as being constructed from the interactions between individuals and their experiences and therefore affect future enrollment decisions (Sutphin & Newsom-Stewart, 1995).

John Dewey (1938) believed there is a "connection between education and personal experience" (p.25), noting that the educational value was directly correlated to the quality of this experience. Kolb (1984) described experiential learning as a "means for examining and strengthening the critical linkages among education, work and personal development" (p.4). Experiential learning is a key component of agricultural education, and positive experiences in the middle school program could lead to enrollment in high school (Cheek, Arrington, Carter, & Randall, 1994).

The conceptual model for this study (Figure 1) details the four main factors affecting student enrollment decision in high school, illustrating the importance of understanding that factors affecting enrollment decisions are interrelated in the agricultural education program.
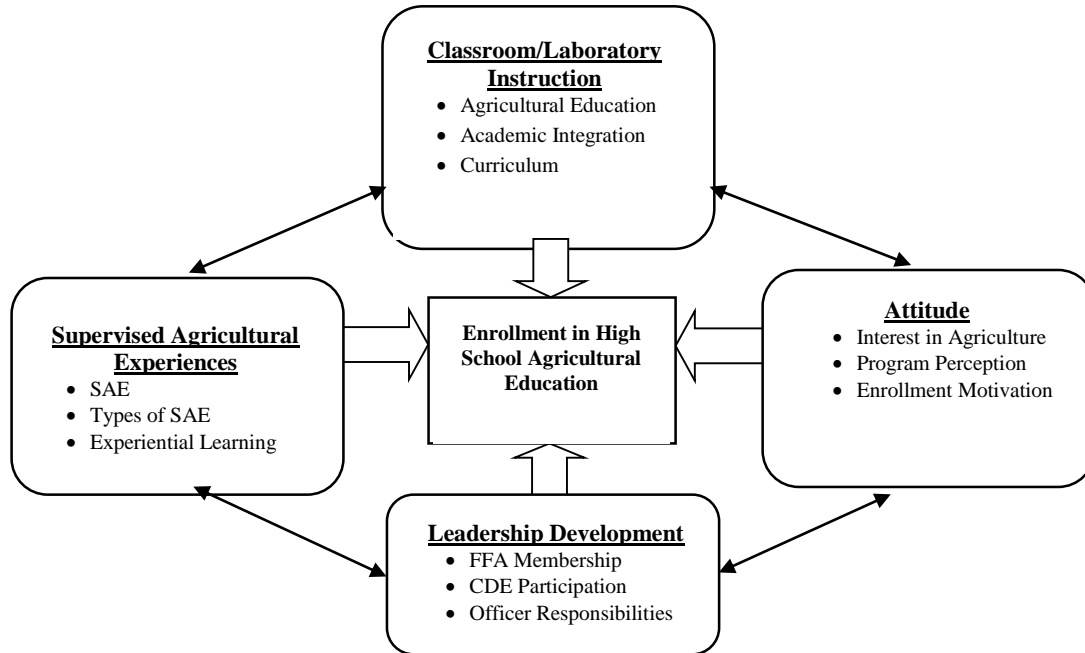
Figure 1. Middle school factors related to high school enrollment.

Enrollment Decisions. Research on student enrollment in agricultural education is primarily focused on enrollment barriers and patterns (Breja, Ball, & Dyer, 2000). However, one study found factors pertaining to student enrollment decisions in agricultural education: course characteristics, enhancement of personal identity, agricultural subject interest, and practical application, among others (Marshall, Herring, & Briers 1992).

Classroom/Laboratory Instruction. Nearly every high school student enrolls in at least one career and technical education (CTE) course during high school (Silverberg, Warner, Fong, & Goodwin, 2004). Classroom/laboratory instruction allows students to learn agricultural competencies and promotes academic integration. These activities prepare students for responsible citizenship and productive employment (Hughes & Barrick, 1993).

Curriculum. The Georgia middle school agricultural education curriculum incorporates essential and relevant performance standards for math, science, language arts and social studies within an agricultural context, assisting middle school students in selecting a high school career pathway (Barge, 2011). In Georgia, middle school students typically enroll in at least one nine-week course each year from 6th through 8th grade.

Supervised Agricultural Experiences. SAEs allow students to apply the knowledge they developed during classroom/laboratory instruction, providing an understanding of those principles in real-world contexts (Phipps, Osborne, Dyer, & Ball, 2008).

Leadership Development. Components of leadership that FFA seeks to develop include persuasion, group dynamics, ability to influence others, and the achievement of goals. Through the development of these skills, school-based agricultural education (SBAE) can assist students

in becoming leaders within the community, state and nation. These leadership components provide students with skills to be successful beyond school (Phipps et al., 2008).

Attitudes. Knight (1987), Hoover and Scanlon (1991), and Sutphin and Newsom-Stewart (1995) identified factors contributing to a decline in agricultural education enrollment. Motivational factors that potentially lead to positive student enrollment decisions include activities associated with agricultural education (Reis & Kahler, 1997).

While there is a significant literature base regarding student enrollment trends and program perceptions, there is a paucity of recent research that specifically pertains to middle school experiences in agricultural education and how they may influence ninth-grade SBAE program enrollment decisions. If middle school students are expected to continue their study in high school agricultural education courses, then it is important to identify middle school experiences in agricultural education that may be related to high school enrollment.

Purpose and Objectives

The purpose of this study was to analyze the experiences of middle school agricultural education students who subsequently enrolled in a high school agricultural education program in Georgia. The research objectives included:
> 1. Determine the background and experiences of 9th grade agricultural education students who were enrolled in middle school agricultural education.
> 2. Determine to what extent middle school experiences in agricultural education influence a student's decision of enrollment in a 9th grade agricultural education course.

Methods

This study utilized a quantitative non-experimental survey research design. This design was selected based upon the type of data intended to be gathered and the population of interest. This study provided data that allowed the researcher to analyze the influence of middle school agricultural education experiences and high school enrollment decisions in agricultural education.

Population and Sample. The population for this study was all 9th grade students enrolled in an agricultural education course in Georgia. A purposive sample was utilized to select one high school program stratified by the six geographic areas of Georgia from the lists and school contact information provided on the Georgia Agricultural Education website (Bridges, 2014). The assumption of this sampling technique was that any "errors of judgment in the selection will counterbalance one another" (Ary, Jacobs, & Sorensen, 2010). Samples drawn from each area of the state could allow for greater generalizability to the entire population of agricultural education students across the state. The research was conducted by surveying 9th grade students in the six counties that had both middle school and high school agricultural education programs.

Instrumentation, Data Collection, and Data Analysis. Dillman, Smyth, and Christian (2009) suggested a five-step process for the administration of group questionnaires that served as the foundation for the instrumentation and data collection process. The instrument included a list of

experiences identified as components of the middle school agricultural education program in the Georgia middle school exploring agricultural education curriculum and the leadership opportunities outlined by the Georgia agricultural education program. The instrument was pilot tested with a similar group of students and reviewed by agricultural education faculty for reliability and validity, respectively; no needed changes were identified. The students utilized a five-point scale (Negative to Positive) to indicate the perceived influence that middle school agricultural education experiences had on their high school enrollment decision. Selected demographic information was also collected.

Findings

The objectives of the study included describing the background and experiences of 9th grade agricultural education students who had been enrolled in middle school agricultural education and determining to what extent middle school experiences in agricultural education influence a student's decision of enrollment in a 9th grade agricultural education course.

Objective One: Of those students who completed the instrument, 53 (49%) were male and 55 (51%) were female. These students ranged in age from fourteen to sixteen years of age, with most (44%) being fifteen years old. Most of the student participants were Caucasian/White (87%). The participants reported a diverse background, with 33 (30%) being from a rural area with a farm, 47 (44%) from a rural area with no farm, and 28 (26%) from an urban area. Also, 65 (60%) reported a family member with a career in agriculture, while 43 (40%) did not have a family member with a career in agriculture.

The participants had varying levels of involvement in middle school agricultural education. Most were enrolled in sixth, seventh, and eighth grade programs. The participants had a variety of SAE programs: 42 (39%) entrepreneurship; 27 (25%) placement; 35 (32%) research, and 4 (4%) exploratory.

Objective Two: Students were asked to rate the level of influence that forty-six middle school experiences had upon their enrollment in high school agricultural education. These experiences were arranged in three sections: supervised agricultural experience, classroom and laboratory instruction, and FFA/leadership development. Students were asked to utilize the following scale: (1) a negative influence, (2) a slightly negative influence, (3) no influence, (4) a slightly positive influence, and (5) a positive influence. Students were asked to mark Not Applicable for anything they did not experience.

For Classroom and Laboratory Experience, students rated hands-on learning as the biggest influence upon their decision to enroll in high school agricultural education, followed by learning about opportunities in the FFA, and learning how agriculture affects life. Learning about the horticulture industry, about forestry and natural resources, and about plant science were rated the least positive influences.

For FFA and Leadership Development, students indicated that being an FFA member was the biggest influence, followed by participating in animal science career development events, and attending chapter meetings. Serving as a chapter officer, participating in agricultural mechanics

career development events, and attending National FFA convention were rated the least positive influences.

For SAE, students indicated that hands-on learning through their SAE was the biggest influence on their decision to enroll in high school agricultural education followed by [my] supervised agricultural experience program, and learning recordkeeping skills. Receiving recognition for [my] SAE, showing livestock, and entering [my] SAE in the agriscience fair were rated the least positive influences.

Conclusions/Recommendations/Implications

Georgia students currently enrolled in a high school agricultural education course indicated the ten middle school experiences that had the most influence upon their enrollment decision: 1.) hands-on learning, 2.) learning about the opportunities available in the FFA, 3.) learning how agriculture affects their life, 4.) hands-on learning through their SAE, 5.) being an FFA member, 6.) outdoor laboratory experiences, 7.) their supervised agricultural experience program, 8.) learning record keeping skills through their SAE, 9.) learning about animal science, and 10.) learning about agriculture in Georgia. Among these experiences, six of the top ten were from classroom and instruction, three were from supervised agriculture experiences, and one was from FFA and leadership development. Six of the top ten experiences are process experiences (how to learn) with the other four being content experiences (what to learn). To help increase future enrollment, middle school agricultural educators need to provide educational opportunities that will help the student learn how to learn while also learning about agriculture.

These results provide a better understanding of the experiences with the greatest influence on a student's enrollment decision. As noted by Cupp and Weaver (1994), Herren and Denham (1990), and Hedrich (1985), these results help to clarify and emphasize the importance of middle school agricultural education in increasing enrollments in high school agricultural education, therefore "closing the gap" between middle school and high school agricultural education enrollment.

Middle school agricultural educators should utilize this list to better understand which experience provides the most influence upon their students to continue enrollment as they enter high school. State staff and teacher educators in agricultural education could utilize these results to maintain a better understanding of the educational experiences that each student should have during involvement in middle school agricultural education.

Future research should be conducted to determine other factors that contribute to enrollment decisions and sustained enrollment for multiple years. It is also just as important to investigate why students choose *not* to enroll in high school agricultural education. Participation in agricultural education is much too valuable, both for the student's education and the future of agriculture, not to fully investigate why students choose to and not to enroll in agricultural education courses/programs. Enrollment is the first step in the development of strong and successful agricultural education programs that will equip to address the challenges in agriculture.

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Development of Socially Responsible Leadership in College of Agriculture Students

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Introduction

Universities historically exist to develop the next generation of leaders and therefore it follows that graduates in every field of work or study will be expected to demonstrate leadership skills to be successful in their chosen careers (Perkin, 1997). As leadership development is an important objective in higher education (Smart, Ethington, Riggs, & Thompson, 2002), some researchers suggest this development of leadership is vital in shaping modern society (Astin & Astin, 2000). Thus, graduates should be prepared to participate in creating global communities dedicated to the common good of all citizens (Rost & Barker, 2000), which requires collaboration, social responsibility and ethics.

Dugan and Komives (2010) posit the college environment offers a multitude of opportunities for higher education to influence students' development of leadership. Programs in agricultural leadership over the years have played a role in developing leadership skills in students while preparing them for a vast array of careers in agriculture. While some traditional approaches to college student leadership development often emphasized positional, hierarchical, and one-way practices of leadership, many modern approaches to leadership are multidirectional, collaborative, networked, and process-oriented (Komives, et al., 2009). Leadership experiences in college are imperative to students entering the fields of agriculture, food and natural resources (Crawford, Lang, Fink, Dalton, & Fielitz, 2011) especially as a need for agricultural leaders with a passion and competence for positive social change increases (Grant, 2012). This research inquiry aligns to the AAAE National Research Agenda, Priority 6, by developing future leaders for communities (Doerfert, 2011).

Literature Review and Framework

Socially responsible leadership is a concept adopted by the philosophy of leadership presented in the Social Change Model (SCM) of leadership development (HERI, 1996). Emphasizing a non-hierarchical approach to leadership, socially responsible leadership is based on "collective action, shared power, and a commitment to social justice" (HERI, 1996, p. 11). According to Komives, Lucas and McMahon (2007), addressing socially responsible leadership is imperative in the development of today's college students. Socially responsible leadership encourages a leadership for all approach, allowing leadership possibilities for all students that want to engage in leadership and create change.

The Social Change Model (SCM) of leadership development provided the framework for this study. The SCM encourages highly participatory, non-hierarchical leadership where leadership is a process, not a position, and is accessible to all people. The SCM of leadership development has two central goals: to assist students in their leadership self-awareness and

leadership competence and to facilitate positive social change (HERI, 1996). The model examines leadership development from three different perspectives: Individual Values, Group Values, and Society/Community Values (see Figure 1). Within the Individual Values perspective, concepts such as development of personal qualities, self-awareness, and personal values are examined. The Group Values perspective examines collaboration and interaction between the group and individual. While the Society/Community Values perspective focuses on bringing about change for the common good.

Figure 1. Social Change Model of Leadership Development.

Purpose and Objectives

The purpose of this study was to determine the development of socially responsible leadership in college students as well as to describe the participation in various college activities including organizations, community service and leadership education within a College of Agriculture, Food and Natural Resources at the University of Missouri. The objectives of this study were to:

1. Determine college students' development of socially responsible leadership.
2. Describe college students' level of organizational involvement and participation.
3. Identify college students' involvement in community service.
4. Describe college students' participation in leadership education.

Methods

This study employed descriptive survey methods. With a total population of 1,124 (525 juniors and 599 seniors) in the College of Agriculture, Food and Natural Resources, the sample size was calculated to be 287 with a 95% confidence level and a ±5 confidence interval. One hundred seven participants completed an online instrument for a 37.3% response rate.

Respondents included 43 males, 64 females, 50 Juniors, and 57 Seniors. Tuckman (1999) recommends sampling 5-10% of non-respondents if fewer than 80% of the sample completed the instrument. The researchers chose to sample 10% of non-respondents (*n* = 18) and compare that group using statistical analysis to determine if a difference existed between these two groups. No significant differences between respondents and non-respondents were found.

An online survey instrument was used which included the Socially Responsible Leadership Scale-Revised version two (SRLS-R2). The SRLS-R2 was obtained with permission through the National Clearinghouse for Leadership Programs at the University of Maryland. The SRLS-R2 utilized a five-point Likert scale (1-*Strongly Disagree* – 5-*Strongly Agree*). The instrument also included sections that were created by the researchers to measure student involvement in organizations, community service, and leadership education.

Findings

Table 1 displays the means (*M*) and standard deviations (*SD*) for the eight socially responsible leadership factors. Commitment, which reflected the students' perception of an investment in an idea or person, both in terms of intensity and duration that motivates the individual and drives the collective effort, had the greatest mean of 4.44 (*SD* = .51). In contrast, Change possessed the lowest mean with 3.76 (*SD* = .46). Change is the desire of making a better world and a better society for oneself and others through the collective efforts of individuals, groups, and communities working together to make that change. Out of the four larger constructs, Individual, Group, Society and Change (see Table 2), the greatest mean was found in Individual (*M* = 4.19, *SD* = .45), while the lowest mean was found in Society (*M* = 3.76, *SD* = .46).

Table 1. Socially Responsible Leadership Scale (*n*=107)

Socially Responsible Construct	M	SD
Commitment	4.44	.51
Congruence	4.18	.53
Common Purpose	4.10	.44
Collaboration	4.06	.45
Citizenship	4.00	.55
Consciousness of Self	3.95	.50
Controversy with Civility	3.85	.40
Change	3.76	.46

Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

Table 2. Social Change Model constructs (*n*=107)

Construct	M	SD
Individual	4.19	.45
Group	4.00	.34
Change	3.98	.72
Society	3.76	. 46

Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

The greatest organizational involvement was identified at the Departmental/Program level (ex. - Horticulture Club) followed by the College level (ex. - Mizzou Ambassadors). A majority (74.7%) of the respondents were involved in two to five different organizations during their college career. Two respondents (1.8%) indicated participating in more than five organizations. Eight respondents (7.5%) indicated having no organizational involvement.

The researchers determined the frequency of student participation in leadership roles and found 14 students (13.1%) identified serving as a president during their college career. An additional 14 students (13.1%) identified serving as vice president. Fifteen students (14.0%) identified serving as secretary while 28 students (26.2%) identified serving as a committee chair in an organization. When asked to describe overall level of involvement in organizations during their college career (1 = Not involved, 4 = Very involved), the calculated mean was 3.01 (SD = .849).

Table 3 and Table 4 display the frequency and origin of community service participation. When respondents were asked to describe overall level of involvement in community service during their college career (1 = not involved, 4 = very involved), the calculated mean was 2.65 (SD = .70).

Table 3. Frequency of Participation (n=107)

Level of Participation	f	%
One-Time Events		
None	27	25.2
1-3	61	57.0
4-6	16	15.0
7+	3	2.8
Regular Basis		
No	48	44.9
Once monthly	26	24.3
Once a week	24	22.4
Several times a week	9	8.4

Table 4. Frequency of Origin of Experience (n = 107)

Scenario	f
With a student organization	72
On your own	49
As part of a class	43
In conjunction with a religious organization	33
Other	1

Students were asked to report involvement with short-term, moderate-term, and long-term leadership experiences. Examples of short-term experiences included an individual or one-time workshop, retreat, conference, lecture or training. Moderate-term experiences included a

single leadership course, multiple or on-going retreats, conferences, institutes, workshops, and/or trainings. Long-term experiences included a multi-semester leadership program, leadership certificate program, leadership major or minor. Table 5 reports student participation in leadership education. When asked to describe overall level of involvement in leadership education during their college career (1 = not involved, 4 = very involved), the calculated mean was 2.23 (*SD* = .94).

Table 5. Frequency of Participation (*n* = 107)

	f	%
Short-Term Experiences		
0	16	15.0
1-2	53	49.5
3-4	24	22.4
5+	14	13.1
Moderate-Term Experiences		
0	45	42.1
1-2	42	39.3
3-4	13	12.1
5+	7	6.5
Long-Term Experiences		
0	74	69.2
1-2	27	25.2
3-4	4	3.7
5+	2	1.9

Conclusions, Discussion, and Recommendations

Based on the findings of socially responsible leadership in college students, it can be concluded that the respondents' self-perceptions vary only slightly among the eight socially responsible constructs. When examined in real limits, the students rate themselves within the *Agree* limit for all eight constructs. In addition, when the overarching constructs are examined the results are very similar. All four constructs fell within the *Agree* limit. If students perceive themselves high in socially responsible leadership, does this imply that the students are receiving non-hierarchical leadership development in the college setting? Or do students really fully grasp the components of socially responsible leadership?

The students had a slightly stronger connection to Individual Values rather than Group, Society, or Change constructs of the Social Change Model. Therefore, it can be implied that the students have a high sense of Consciousness of Self, Congruence and Commitment as seen within the Individual Values perspective. The high sense of those factors provides a solid foundation to build upon for leadership educators. When the purpose or value of an organization, community service, or educational experience can be shown to the student the level of commitment and willingness to participate increases. However, if the purpose or shared values are not evident the student may shy away and miss out on a beneficial experience. The areas of group, society, and change will need to be focused upon and enhanced if the goal is to truly develop socially responsible leadership in students.

Based on the findings, students are engaged in a number of organizations. The question becomes is the organization a place where socially responsible leadership is being developed? Educators and organizational sponsors may need to influence the culture by rewarding depth of involvement and leadership within organizations more than rewarding the number of organizations a student holds membership. If more students are able to see the benefit of true dedication to a cause, the culture may shift from the number of organizations a student lists on a resume to an organization being a vehicle for making a difference on campus and in the community.

Students are engaging in short-term leadership experiences rather than moderate to long-term leadership experiences. This may be due to students starting leadership education on a trial basis or a lack of time available to devote to the longer programs. Granted, short-term leadership program have shown to result in significantly higher leadership outcomes for students than those who do not participate but most leadership educators would agree that more sustained engagement in leadership is better. Students may not be taking full advantage of the more extensive leadership programs available to them so it is essential that students are aware of the leadership programs available and the potential benefits.

Recommendation for further research would be to replicate the study in other institutions to determine whether socially responsible leadership is present within the student population. Further research is also recommended to determine the influence specific experiences have in relation to socially responsible constructs. In addition, qualitative research is recommended to identify specific aspects of organizational involvement, community service and leadership education participation and the resulting views on socially responsible leadership development. Specifically, an examination into student efficacy in making positive societal changes within their communities or the approach programs utilize in teaching leadership. A better understanding of preparing socially responsible leaders is needed for the agricultural leaders of tomorrow.

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Identifying epistemological beliefs of award-winning teaching faculty: A perspective from Sweden

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Introduction

To expand and improve the current vision of effective teaching in the U.S. agricultural education, a more global understanding of the pedagogical approaches of other leading agricultural universities award-winning teaching faculty is imperative. In its first articulated international strategy, the United State Department of Education (2012) called for "global competencies for all students" and "education diplomacy and engagement with other countries" (p.1). This study concentrates on the award-winning teaching faculty at The Swedish University of Agricultural Sciences (SLU). SLU espouses a similar educational mission and vision in undergraduate agriculture education as the Pennsylvania State University, College of Agricultural Sciences in the United States. Higher education and research in green industries is mainly offered in Sweden at the Swedish University of Agricultural Sciences (SLU). Education and research aim to produce and communicate new knowledge as well as educate qualified personnel for industries and enterprises within such areas as forestry, the entire food production chain, landscape preservation and aquaculture (Swedish Higher Education Authority, 2013). For decades, educational researchers have examined the many facets of teaching practices, theories, and effectiveness. The role of teachers' personal beliefs and theories have on their actual teaching practice has been a central focus of educational research in the past (Ableser, 2012; Bullough, 1997; Clark & Peterson, 1986; Ethell, 1997; Kagan, 1992; Kane, Sandretto, & Heath, 2002; Pajares, 1992; Richardson, 1996; Trumbull, 1990).

There is a lack of recent empirical evidence depicting university instructors espousing their teaching beliefs and then actually practicing those beliefs, which presents challenges when trying to articulate the relationship between teacher beliefs, teachers' classroom practices and pedagogies, and student outcomes. To fully understand, there remains a need to further explore the phenomenon occurring in the college classroom; empirical evidence needs to be collected to reduce limitations in current studies centered on improving teaching in higher education.

Conceptual Framework

The conceptual framework for this study was guided by relevant theoretical and empirical research. The beliefs that teachers hold about their teaching are often referred to as teachers' theories, personal theories, practical theories, or theories of professional practice (Argyris & Schön, 1974; Clark & Peterson, 1986; Sanders & McCutcheon, 1986; Siedentop, 1991).

The researcher's conceptual model examines practitioners of post-secondary agriculture education, qualitatively, on the role epistemological and pedagogical beliefs play in forming a practitioner's discipline specific content knowledge. The discipline specific content knowledge creates an epistemological lens in which the practitioner develops a teaching theory, which includes discipline specific teaching practices and strategies. Figure 1 provides a visual model of the conceptual framework for this study. The study centered on the epistemological lens in which SLU Faculty define their teaching.

Theoretical Framework

The theoretical framework used to guide the study is Theories of Action developed by Agyris and Schön (1974). Agyris and Schön (1974)

Post-Secondary Instruction in Agriculture, Food and Natural Resources
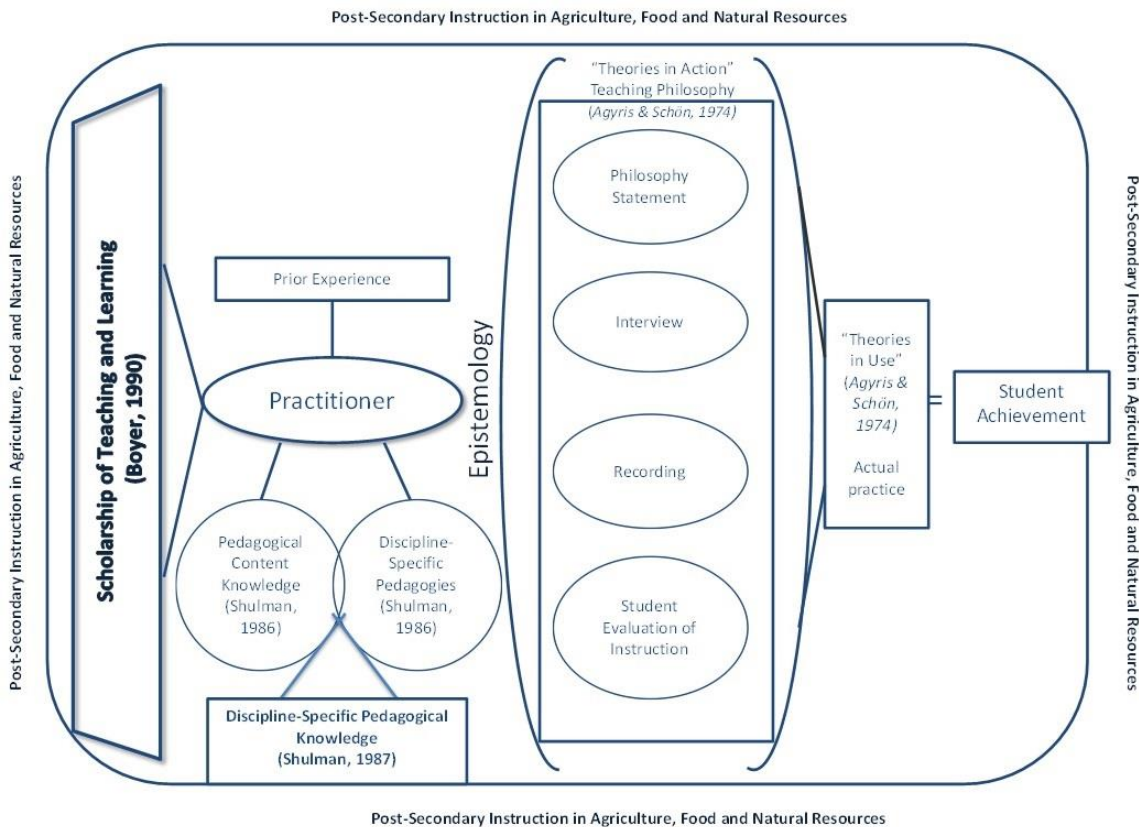
Figure 1. Conceptual framework examines practitioners of post-secondary Agriculture Education, on the role epistemological and pedagogical beliefs play in forming a practitioner's

explained "theories of professional practice" as a set of interconnected propositions about the purpose of teaching, the roles of the teacher and students, and the set of teaching practices enacted in their classrooms. This framework "include[s] the values, strategies, and underlying assumptions that inform individuals' patterns of interpersonal behavior" (Schön 1987, p. 255).

Purpose
The purpose of the research project is to make explicit links between faculty espoused teaching theories and faculty teaching practice. The research project will allow for researchers to better understand how university academics learn to teach to improve postsecondary agriculture education. The objective that guided this portion of the study is as follows:

1. Identify the epistemological and pedagogical teaching beliefs of purposefully selected faculty at The Swedish University of Agricultural Sciences (SLU).

Methods
The study employed a case–study approach (Gall, Gall, & Borg, 2003) of seven instructors who were deemed to be excellent teachers according to their receipt of an award honoring their teaching. The researchers used a basic qualitative design to frame their interview research methods (Creswell, 1994). The research relied heavily on one-to-one semi-structured interviews (Merriam, 1998). Interviews were transcribed verbatim.

The goal of qualitative data analysis is to uncover emerging themes, patterns, concepts, insights, and understandings (Patton, 2002). Content analysis as a research method is a systematic and objective means of describing and quantifying phenomena (Krippendorff, 1980; Downe-Wamboldt, 1992; Sandelowski, 1995). Content analysis was conducted to provide condensed and broad descriptions of the phenomenon (Elo & Kyngä, 2008).

Findings
The research objective for this study was to identify the epistemological teaching beliefs of purposefully selected faculty at The Swedish University of Agricultural Sciences (SLU). Seven faculty members from The Swedish University of Agricultural Sciences served as the population for the research study. The findings of the epistemological and pedagogical beliefs are reported in the form of themes supported by quotes from the interview transcripts. While each theme was evidenced by a richness of repeated responses and multiple interviews, due to space limitations only one quote per theme will be shared in this abstract.

Theme 1: The SLU faculty held a range of epistemic attitudes that were more or less contextualistic in orientation.
The seven faculty members were likely to hold a range of epistemic beliefs. According to Schraw and Olafson (2002), "teachers' epistemological worldviews influence the ways that they make important instructional decisions related to the curriculum, pedagogy, and assessment." Schraw and Olafson (2002) describe three kinds of epistemological world views; realist, contextualist, and relativist. A realist assumes that knowledge is acquired through experts and learning is a passive act. Contexualists see themselves as facilitators, who along with the learners collaboratively construct shared understanding. While the relativists view learners as independently and uniquely creating their own knowledge.
Professor R: *"I think my role is to guide them through the subject and help them also to read the book, and guide them through the part that may be complicated for them and also I think the scientific perspective that we don't know everything and its still hypothesisism (sic)"*
Theme 2: The SLU faculty held a range of pedagogical beliefs that were more or less learner-centered in orientation.
Ertmer (2005), investigated teacher beliefs about teaching and learning, called these beliefs pedagogical. Teachers' pedagogical beliefs play a central role in their teaching practices, including choosing the subjects and activities, decision-making, and evaluation in the classrooms (Ertmer, 2005). A commonly used distinction in studies is associated with two prototypical

ideologies: teacher-centered or teaching-oriented belief and learner-centered or learning-oriented belief (Meirink, Meijer, Verloop, & Bergan, 2009; Schuh, 2004).

Professor M: *"The role of the students should be an active one, of course. The student is constructing, I like the concept of constructivism, and has to be expose to some extent of confusion and the process of assimilation events that take place that must make people realize that they don't know everything."*

Theme 3: The SLU Faculty equally engage in reflection-in-action and retrospective reflection-on-action on their teaching practices.

There are different traditions in reflective practice that influence how one conceptualizes the role or emphasis of reflection in the life of the teacher (Zeichner, 1994). Schön (1983; 1987) identified two categories of reflection, reflection-in-action, which occurs continuous and synchronous with teaching, and reflection-on-action, which occurs asynchronously at some point after class, and disconnected from teaching actions. The process of reflection promotes the interplay between general and personal pedagogical knowledge such that perceptions formed by personal beliefs and experiences are broadened and made more objective (Shulman, 1987; Gess-Newsome & Lederman, 1999).

Professor D: *"One thing is, of course, the course evaluations. If my parts of the course or whatever is judged as good, then of course that's good, and if it's next year a little bit better and it could also be that the students who fill in the form say that okay, this is good, but that we didn't understand, okay, then until next year I may change that task a little bit or may exclude it or I may have it the same but give more information around it and see and try to improve single parts of it, so that's one thing."*

Theme 4: The SLU Faculty feel confident in their teaching abilities.

Faculty in higher education play an important role in preparing students for the demands of solving society's complex issues. What faculty believe about their teaching capabilities affect their classroom teaching behaviors (Morrell & Carroll, 2003; Yeung & Watkins, 2000). What individual faculty members believe about their capability to perform specific teaching skills in the classroom affect their practice through the selection of teaching methods, their motivation to follow through with those methods, their persistence when they encountered difficulties in the classroom environment, and their ability to recover after perceived failure (Bandura, 1997; Dellinger, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

Professor P: *"Actually, I do. I feel since I used to say to my colleagues that when I had a course, I mostly felt it was a catastrophe, I think, and [now] each time I have it, the students are very satisfied and give me very good assessment. And when I talk to students and when I have my lecture, I actually feel very confident."*

Conclusions

The purpose of this research was to explore the epistemological and pedagogical beliefs of identified award-winning university teachers. The researchers sought to provide valuable knowledge relating to the university teaching and learning that takes place within specialized disciplinary settings, each characterized by its unique traditions, concepts, practices and procedures. There is an increasing importance in understanding discipline-specific pedagogical knowledge of higher education teachers that draws from their knowledge base for teaching, the specific characteristics of their discipline, and their personal beliefs about teaching (Kreber, 2009).

The SLU faculty held contextualist epistemological teaching beliefs, which suggests SLU faculty hold beliefs that learners must construct shared understandings in supportive contexts in which faculty serve as facilitators, which aligns with their pedagogical beliefs of having a learner-centered instructional approach. The SLU faculty are less concerned with the type of knowledge that students construct, than the process by which they construct that knowledge. SLU faculty are concerned with building a strong knowledge foundation and to develop learning skills and learner self-awareness, and do this by functioning as a facilitator who assists students as they design their learning.

The findings conclude SLU faculty turn experience into knowledge through the use of reflection to improve and build on their teaching. However, there is lack of evidence to the extent in which the faculty constructively and critically reflect on their practice. Further research is suggested to investigate the nature and application of faculty reflection and its actual impact.

Individuals who are confident of their capabilities will select higher goals and deploy their skills and efforts more effectively than those beset by self-doubt (Acebo, 2008). Although the SLU faculty was overall confident in their teaching, faculty may experience differing levels of confidence based on changes to context, task difficulty, and feedback from previous experiences. Employing deep reflection can lead to identifying such experiences and changes in confidence.

Recommendations

The global nature of agriculture as industry means that much can be learned from our peers engaging in similar missions across the world. This synergy can help ensure the U.S. agricultural education achieves its maximum potential. More dynamic assessment of epistemological and pedagogical beliefs are recommended in colleges of agriculture around the world to identify the interactive relationships between the development of epistemological and pedagogical beliefs of teachers and students, cultures, and learning environments. Further research will also lead to identifying the philosophy of a culture and values embedded in a culture that impact the development and strengthening of teacher and student beliefs. More empirical studies are needed for researchers to build better understanding about which belief is affecting which action, and subsequently how to address or change teachers' beliefs (Ertmer, 2005).

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A National Analysis of Agriculture Teachers' Work-Family Balance and Job Satisfaction

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Introduction

A growing trend in agricultural education literature is the importance of agriculture teachers' work-family balance (WFB) ability (Crutchfield, Ritz, & Burris, 2013; Lawver, 2007; Murray, Flowers, Croom, & Wilson, 2011; Sorensen & McKim, 2014). WFB ability refers to an individual's capacity to successfully manage the demands of both their work and family roles. Teaching agriculture is a demanding work role (Lambert, Henry, & Tummons, 2011; Lawver, 2007; Murray et al., 2011); therefore, emphasis should be placed on understanding an individual's ability to balance the demands of teaching agriculture with the demands of other life roles.

Existing research exploring agriculture teachers' level of WFB ability has conflicting results, with some studies suggesting agriculture teachers struggle to balance multiple life roles (Foster, 2001; Murray et al., 2011; Sorensen & McKim, 2014) and other research identifying agriculture teachers have high WFB ability (Crutchfield et al., 2013). In addition to research exploring the level of WFB ability among agriculture teachers, research has also identified a positive relationship between WFB ability, career commitment (Chaney, 2007; Crutchfield et al., 2013; Sorensen & McKim, 2014), and job satisfaction (Sorensen & McKim, 2014). However, existing research has been limited to a specific gender (Foster, 2001), state (Chaney, 2007; Murray et al., 2011; Sorensen & McKim, 2014), or region (Crutchfield et al., 2013). In this study, we sought to build from existing literature by conducting the first national analysis of the relationship between WFB ability and job satisfaction. Additionally, we sought to extend the literature by exploring the relationship between work and family variables and their relationship with agriculture teachers' WFB ability.

Theoretical Framework

We utilized the conservation of resources (COR) theory to frame this analysis (Grandey & Cropanzano, 1999; Hobfoll, 1989). COR theory suggests individuals seek to build and protect resources (i.e. energy, status, and personal value) within each of their life roles (Hobfoll, 1989). Satisfaction within these life roles emerges when the individual is able to successfully balance life roles to retain their established resources within their different roles (Grandey & Cropanzano, 1999). However, dissatisfaction occurs when resources are lost or strained due to failure to balance multiple life roles (see Figure 1).
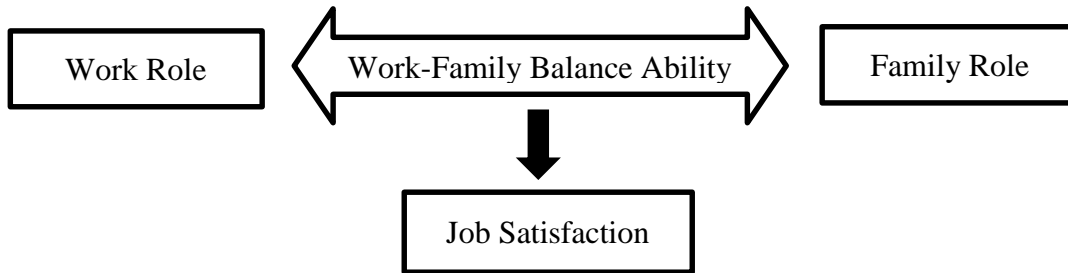
Figure 1. A conceptual model of work roles, family roles, work-family balance ability, and job satisfaction (adapted from Sorensen & McKim, 2014).

Purpose and Objectives

The purpose of our research was to extend existing literature on secondary agriculture teachers' WFB ability through a national analysis exploring the relationship between work variables, family variables, and WFB ability as well as the relationship between WFB ability and job satisfaction. Given the identified links between WFB ability, career commitment, and job satisfaction (Chaney, 2007; Crutchfield et al., 2013; Sorensen & McKim, 2014), this analysis addresses National Research Priority three which calls for research into "A sufficient supply of well-prepared agricultural scientists and professionals" (Doerfert, 2011, p. 18). The following research objectives guided the development and execution of our research:

1. Describe the work and family characteristics of responding teachers.
2. Determine the relationship between work and family characteristics and agriculture teachers' work-family balance ability.
3. Determine the relationship between work-family balance ability and job satisfaction among secondary agriculture teachers.

Methods

The target population for this study was all secondary agriculture teachers during the 2014-2015 school year who self-identified as being active participants in a family role. Family role participation, defined as "any and all committed relationships that might influence how time is invested in the non-work domain," was an important qualifier given our interest in teachers' ability to balance work and family roles. We obtained a simple random sample of 778 agriculture teachers from the National FFA Organization. The survey instrument was sent, utilizing protocols from Dillman's (2007) tailored design method, to all 778 potential respondents. A total of 75 emails bounced and 34 respondents did not meet the population parameters (i.e. not secondary agriculture teachers or did not self-identify as being active participants in a family role). Of the remaining 669 potential respondents, 234 (34.98%) provided useable responses.

The instrument utilized in this research was part of a larger study. The variables of interest for our analysis were workplace characteristics, family characteristics, work-family balance ability, and job satisfaction. The workplace characteristics included weekly work hours during the regular school year, years of teaching experience, and average number of students per class.

Family characteristics included marital status and number of children. We also controlled for other life roles by including a variable, ranging from zero to six, in which respondents indicated the number of additional life roles they were involved in from the following list: student, church member, coach, employee outside of agriculture teaching, community leader, or other. We felt controlling for external life roles gave us a better glimpse into how agriculture teachers are balancing their agricultural educator and family responsibilities in light of other life roles.

Agriculture teachers' WFB ability and job satisfaction were measured using previously established instruments. WFB ability was measured using the three-item scale developed by Chaney (2007). An example item from this construct states, "*I am able to balance quality time between my work and my family commitments*." Job satisfaction was measured using the five-item construct developed by Judge, Bono, and Locke (2000). An example item from this construct states, "*I find real enjoyment in my work*." Participants rated each item within the two constructs on a six-point scale ranging from one "Strongly Disagree" to six "Strongly Agree." Face and content validity for the instrument were evaluated by a panel of experts at Oregon State University. Additionally, the instrument was pilot tested for reliability among 30 career and technical educators in Oregon, results indicated the constructs of interest were reliable (i.e. Cronbach's alphas for job satisfaction = .88 and WFB ability = .92).

Demographic data was utilized to describe the work and family characteristics of responding teachers. Research objective two, determine the relationship between work and family characteristics and WFB ability, was achieved using a multiple linear regression with other life roles as a control variable. The relationship between WFB ability and job satisfaction was analyzed utilizing a simple linear regression.

Findings

The first objective of this study was to describe the work and family characteristics of agriculture teachers. For workplace variables, responding agriculture teachers reported working, on average, 55.77 hours per regular work week plus an additional 4.04 hours per weekend during the regular school year for a total of 59.81 hours per week. Responding agriculture teachers had an average of 17.75 years of teaching experience and taught an average of 20.22 students per class. For the family variables, 93.24% of responding teachers indicated they were married at the time of data collection. Additionally, responding agriculture teachers indicated having responsibility for 1.67 children.

The second objective was to determine the relationship between work and family characteristics and agriculture teachers' WFB ability (see Table 1). We simultaneously entered the work and family variables into a regression as independent variables with WFB ability as the dependent variable and other life roles as a control variable. In combination, the work and family characteristics produced a statistically significant model (*p*-value < .001) and accounted for 19% of the variance in agriculture teachers' WFB ability (R^2 = .19). The number of hours agriculture teachers reported working each week, including weekends, during the regular school year was a statistically significant, negative predictor of WFB ability (β = -.37; *p*-value < .001). Additionally, the indicator variable for teachers being married was a significant, negative predictor of WFB ability (β = -.16; *p*-value = .018).

Table 1

Relationship between Work and Family Characteristics and Work-Family Balance

Variable	Zero-order correlation (r)	p-value	B	SEB	β	p-value
	Dependent Variable: Work-Family Balance Ability					
Weekly Work Hours	-.38	<.001	-.03	.01	-.37	<.001
Years of Teaching Experience	.18	.009	.01	.01	.11	.110
Average Students per Class	.01	.872	.01	.01	.04	.532
Married	-.16	.021	-.73	.31	-.16	.018
Number of Children	.11	.125	.03	.06	.03	.652
Other Life Roles	.02	.805	-.01	.07	-.01	.927

Note. $R = .430$, $R^2 = .19$, $F = 6.63$, p-value $< .001$. Weekly work hours included average hours worked during week and weekend within a regular school year. Married variable was coded as an indicator variable with zero "Unmarried" and one "Married." Other Life Roles was coded from zero to six based on the total number of external life roles (e.g. coach, community leader) respondents indicated they participated in. Work-family balance ability items scaled from one "Strongly Disagree" to six "Strongly Agree."

The third research objective sought to determine the relationship between WFB ability and responding agriculture teachers' job satisfaction. The simple linear regression model with WFB ability as the independent variable and job satisfaction as the dependent variable was statistically significant ($F = 20.518$; p-value $< .001$) with 8% of the variance in agriculture teachers' job satisfaction ($R = .289$; $R^2 = .08$) being accounted for by WFB ability ($B = .240$; $SEB = .053$; $\beta = .289$; p-value $< .001$).

Conclusions, Recommendations, and Discussion

The purpose of this analysis was to extend existing literature within agricultural education investigating work-family balance ability. This purpose was achieved by collecting data on work characteristics, family characteristics, WFB ability, and job satisfaction from a simple random sample of agriculture teachers in the National FFA database. In the first objective, we analyzed the work and family characteristics of responding teachers. We feel this information provides valuable data concerning secondary agriculture teachers' work and family characteristics during the 2014-2015 school year.

In the second research objective, we identified the combination of work and family variables comprised a significant model of agriculture teachers' perceived WFB ability. Specifically, we identified working additional hours and being married were related to significantly lower levels of reported WFB ability. The conservation of resources theory states an individual attempts to

collect and conserve resources (i.e. energy, status, and personal value) within their work and family roles (Grandey & Cropanzano, 1999; Hobfoll, 1989). Our study suggests working additional hours as an agriculture teacher and being married require additional resources in both the work and family roles that limit an agriculture teachers' ability to balance work and family. As a profession, we should look to potential options for reducing the time obligations of agriculture teachers' work role. This may require reducing the work expectations (e.g. paperwork, hours of FFA activities, and hours of professional development) of teachers, educating teachers on work efficiency strategies, and/or revising disciplinary norms regarding what is successful agriculture teaching.

The importance of efforts to support the WFB ability of secondary agriculture teachers is magnified by the findings from our third research objective in which we identified a significant, positive relationship between WFB ability and job satisfaction. These findings indicate reduced WFB ability is related to reduced satisfaction with the agriculture teaching profession. These findings support previous research in agricultural education which has found a positive relationship between WFB ability and agriculture teachers' job satisfaction (Sorensen & McKim, 2014). Furthermore, these findings support the conservation of resources theory which links an individual's ability to balance multiple life roles with satisfaction in those roles (Grandey & Cropanzano, 1999; Hobfoll, 1989). In total, these findings reaffirm continued investigation into those factors that influence an agriculture teachers' WFB ability.

Agricultural education is a demanding profession (Lambert et al., 2011; Lawver, 2007; Murray et al., 2011), yet the impact on students can be extraordinary. However, the demands of being an agriculture teacher appear to limit teachers' ability to balance their work and family which, in turn, reduces their satisfaction in the profession. This is evidence of a dangerous spiral of increased work, inability to balance work and family, and job dissatisfaction. This spiral has the potential to fuel continued attrition from the agriculture teaching profession. The agriculture teaching profession must address this issue by answering the question, how do we make the same positive impact on students while supporting the WFB ability of agriculture teachers?

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Bridging Experiences and Outcomes in Agricultural Leadership Education

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Introduction, Objectives, and Framework

Agricultural education has been tasked with developing a sufficient supply of well-prepared agricultural scientists and professionals to insure a successful future for agriculture (Doerfert, 2010). To prepare that next generation of professionals will require the development of interpersonal and leadership skills (National Association of Colleges and Employers, 2014). Therefore, agricultural education must consider the best methods for developing interpersonal and leadership skills among students. Our study explored postsecondary agriculture student leadership growth with the aim of identifying specific learning experiences related to the development of interpersonal and leadership skills.

A number of studies have explored learning experiences used in leadership education (Albert & Vadla, 2009; Allen & Hartman, 2009; Conger, 1992; Day, 2001; Eich, 2008; Jenkins, 2012). Identified learning experiences include experiential learning, self-assessments, mentor programs, and reflection. Additionally, research has addressed leadership development within leadership education (Blackwell, Cummins, Townsend, & Cummings, 2007; Goertzen, 2009; Rosch & Caza, 2012; Rosch & Schwartz, 2009). Identified outcomes associated with leadership programs include increased leadership capacity, leadership knowledge gain, and increased confidence enacting leadership skills. However, while these studies highlight the diversity of pedagogical approaches and numerous positive outcomes within leadership education, they fail to provide insight into the connection between curriculum and student growth.

The specific objectives of our research were to (a) identify leadership skill development within a leadership program and (b) identify the learning experiences connected to the areas of highest leadership development. We utilized the theory of student involvement (Astin, 1999) to construct this study. The theory of student involvement posits students enter college with identified inputs and through their experiences, identifiable outcomes emerge. We operationalized this theory by analyzing the development of leadership skills from the beginning of the program (i.e. input) to the end of the program (i.e. output) and how this development was connected to specific learning experiences (i.e. experience).

Methods

The population for our research included two cohorts ($N = 23$) of students enrolled in a year-long agricultural leadership development program at Oregon State University. Students ranged from sophomore to senior standing. The program consisted of a two hour, weekly class time; working with a faculty mentor; and community-based leadership experiences.

Leadership skill development was assessed using a leadership needs assessment (**Velez, McKim, & Simonsen, 2013**) which assessed 13 leadership constructs. This 88 question instrument

solicited student perceptions of importance and competence in the following constructs: **awareness of self, commitment to serving, developing teams, enhancing communication, ethical behavior, leading change, managing conflict, managing projects, practicing citizenship, sustaining leadership, understanding community, understanding leadership, and valuing diversity.** A pilot test of the instrument revealed reliabilities, using Cronbach's alphas, ranging from $\alpha = .89$ to $\alpha = .96$. In each of the thirteen areas of leadership, a mean weighted discrepancy score (MWDS) was calculated. MWDSs were calculated by determining the discrepancy between the perceived importance and competence of each item in the construct; that discrepancy was then multiplied by the importance mean and divided by the number of observations (see formula below; Borich, 1980).

$$\frac{\sum [(\text{Importance - Ability}) * \text{Importance Mean}]}{\text{Number of Observations}} = \text{MWDS}$$

The first round of data collection was administered prior to student engagement in the leadership development program (Fall 2012 and Fall 2013). The final assessment of leadership was administered one week after completion of the leadership development program (Spring 2013 and Spring 2014). All students in the population ($N = 23$) completed both the pre and post assessment. In addition to the needs assessment, researchers administered a survey to the three faculty members of the program. Faculty members were asked to identify, for each of the learning experiences in the program, the two leadership need areas that were met by the objectives of that experience.

Findings

In order to accomplish research objective one, "identify leadership skill development within a leadership program," MWDSs were calculated for each of the 13 constructs, first for each individual and then an average for the cohort. A higher MWDS indicates a higher perceived need. The MWDSs indicate students perceived the largest need in the areas of commitment to serving (MWDS = 7.36), enhancing communication (MWDS = 6.22), and understanding community (MWDS = 6.15) before engaging in the program (see Table 1).

The MWDS scores, after completing the program, indicate students perceived the highest need in the areas of managing conflict (MWDS = 5.76), understanding community (MWDS = 5.34), and commitment to serving (MWDS = 5.25). Pre and post experience MWDSs were compared using a paired sample *t*-test. A decrease in the MWDS indicates students perceived less need in that leadership area at the completion of the program than they did before the start of the program. Researchers suggest a decrease in the perceived need of a leadership area indicates successful development of that leadership area. Due to the limited number of respondents, an effect size (Cohen's *d*) is reported to present a more realistic interpretation of the data compared to *p*-values, which are limited when dealing with small populations and/or samples. The criteria used to describe the effect sizes are: small effect = .20 to .49; medium effect = .50 to .79; and large effect = .80 and up (Cohen, 1988).

Table 1

Comparing Mean Weighted Discrepancy Scores Before and After the Leadership Development Program

Leadership Area	MWDS[1]		ΔMWDS	t-value	p-value	Effect size (Cohen's *d*)
	Pre Test	Post Test				
Awareness of Self	5.14	3.67	1.47	1.60	.117	0.47
Commitment to Serving	7.36	5.25	2.11	1.89	.066	0.56
Developing Teams	5.27	3.66	1.61	1.77	.084	0.52
Enhancing Communication	6.22	4.25	1.97	3.26	.002	0.96
Ethical Behavior	4.85	2.90	1.95	2.72	.009	0.80
Leading Change	5.54	3.98	1.56	1.39	.171	0.41
Managing Conflict	6.11	5.76	0.35	0.32	.752	0.09
Managing Projects	5.88	4.20	1.68	1.97	.055	0.58
Practicing Citizenship	6.05	4.36	1.69	1.40	.169	0.32
Sustaining Leadership	5.61	3.88	1.73	1.48	.147	0.43
Understanding Community	6.15	5.34	0.81	0.70	.485	0.21
Understanding Leadership	5.54	3.28	2.26	2.91	.006	0.86
Valuing Diversity	5.20	3.43	1.77	1.66	.103	0.49

[1]Mean Weighted Discrepancy Score, higher score indicates a higher perceived need.

Students' perception of their needs in each of the 13 leadership areas decreased. The most substantial effect was observed in the area of enhancing communication (Cohen's *d* = 0.96). Large effects were also seen in understanding leadership (Cohen's *d* = 0.86) and ethical behavior (Cohen's *d* = 0.80). Medium effects (Cohen, 1988) were observed in the areas of managing projects (Cohen's *d* = 0.58), commitment to serving (Cohen's *d* = 0.56), and developing teams (Cohen's *d* = 0.52). Small effect sizes (Cohen, 1988) were identified in the areas of valuing diversity (Cohen's *d* = 0.49), awareness of self (Cohen's *d* = 0.47), sustaining leadership (Cohen's *d* = 0.43), leading change (Cohen's *d* = 0.41), practicing citizenship (Cohen's *d* = 0.32), and understanding community (Cohen's *d* = 0.21). A negligible effect was observed in the area of managing conflict (Cohen's *d* = 0.09).

The second research objective, "identify the learning experiences related to the areas of highest leadership development," sought to provide information into the learning experiences faculty of this leadership development program unanimously identified as targeting the top five leadership skill areas developed over the course of leadership development experience (see Table 2). These five leadership skill areas were identified based on the largest change in perceived leadership need before and after the leadership development experience and included understanding leadership (ΔMWDS = 2.26), commitment to serving (ΔMWDS = 2.11), enhancing communication (ΔMWDS = 1.97), ethical behavior (ΔMWDS = 1.95), and valuing diversity (ΔMWDS = 1.77).

Table 2

Identifying Learning Experiences Utilized to Develop Leadership

Leadership Area	Learning Experiences[1]
Understanding Leadership	Faculty members identified four seminars addressing understanding leadership. These seminars included two panels of industry professionals discussing their personal leadership experiences, a 360 assessment of personal authenticity, and a peer reflection activity at the conclusion of the program. Additionally, faculty noted reading and discussing the book *How to Win Friends and Influence People*, meeting with a faculty mentor for one to two hours per month, and involvement in an off-campus community organization as valuable experiences to students' understanding of leadership.
Commitment to Serving	Students participated in a *giving back panel* in which donors to the university shared their experiences as leaders at different phases of their lives as well as the importance of giving back. Additionally, participation in an off-campus community organization was identified as a contributing factor to students' commitment to serving.
Enhancing Communication	Faculty members identified four seminars addressing enhanced communication. These seminars included students practicing and providing feedback on clear and concise written messages, engaging in a first impression activity with feedback, developing and implementing meeting agendas, and identifying/working with difficult people. Additional experiences highlighted as building students' communication skills included working in peer advisory boards for one term and the structured faculty mentoring opportunity.
Ethical Behavior	Faculty noted reading and discussing the book *True North*, the *giving back panel* in which donors to the university shared their experiences as leaders at different phases of their lives, and being mentored by a faculty member as valuable experiences toward building ethical behavior.
Valuing Diversity	Faculty identified reading and discussing the book *True North* as well as students' participation in an off-campus community organization as building competence in valuing diversity.

[1]Only those experiences that all three faculty members identified as meeting the leadership area are identified.

Conclusions and Recommendations

This study sought to identify leadership skill development among students enrolled in a year-long agricultural leadership development program using a leadership needs assessment. Additionally, this study sought to provide evidence of potential links between leadership skill development and specific learning experiences. Identifying specific curricular experiences connected to leadership development among postsecondary agriculture students has the potential to greatly increase the effectiveness of agricultural leadership education programs.

Researchers calculated mean weighted discrepancy scores (MWDSs) for all participants at the beginning and end of an agricultural leadership development program. Researchers identified decreases in each of the 13 MWDSs from the beginning to the conclusion of the leadership development program, indicating increased leadership skill development. Due to the methods of this study, researchers cannot definitively attribute the change in leadership needs to participation in the leadership development program. Researchers acknowledge that development of leadership skills could be a product of maturity or experiences outside of the leadership development program. However, the evidence provided in this study suggests a relationship between involvement in the agricultural leadership development program and development of leadership skills. Future studies should consider the use of control groups, not involved in the leadership development program, when analyzing the leadership development of students. Utilizing control groups will provide more concrete evidence of a relationship between leadership skill development and involvement in agricultural leadership development.

In addition to identifying the changes in leadership needs among students, researchers sought to identify learning experiences related to leadership skill development. Our research identified a variety of learning experiences utilized to develop leadership among students. However, a few learning experiences stood out as developing multiple areas of leadership. These experiences included participation in a giving back panel, being mentored, community-based experiences, and reading leadership texts (e.g. *True North*). **We encourage leadership educators to consider including these learning experiences if the corresponding outcomes align with their program's goals.**

While we feel this research provides valuable information, we acknowledge our study was completed within only one program. The reduced scope of this research potentially influenced the relationships identified between curricular experiences and leadership outcomes. Therefore, we encourage future research exploring the relationship between leadership outcomes and curricular experiences among wider populations. We feel this line of research has tremendous potential to benefit agricultural leadership educators and developing leaders alike.

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Does the Quantity of Agricultural Mechanics Training Received As Secondary Students Effect Teacher Competence?

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Introduction

Agricultural mechanics instruction is an important component of secondary agricultural education programs in the United States and laboratory experiences are an integral component of agricultural mechanics instruction (Bear & Hoerner, 1986). Phipps, Osborne, Dyer, and Ball (2008) noted that the primary objective of agricultural mechanics education is the development of the abilities necessary to perform the mechanical activities to be completed in agriculture. According to the U.S. Bureau of Labor Statistics the U.S. could potentially face a shortfall of around 875,000 machinists, welders, industrial-machinery mechanics, and industrial engineers by 2020 (Peralta, 2014). Agricultural mechanics courses offered in secondary agricultural education programs can prepare young people for these opportunities. Therefore, a need exists to assess how teachers are being prepared to teach agricultural mechanics (Hubert & Leising, 2000).

Being prepared and properly educated in teaching agricultural mechanics can emerge from a variety of avenues and experiences from secondary education through professional development. Bear and Hoerner (1986) noted laboratory experiences are an important part of agricultural mechanics instruction and efficient management of the laboratories is essential to maximize student learning. Predetermined beliefs of teachers often influence how they teach content in both the classroom and laboratory (Knobloch, 2008). Fraze, Wingenback, Rutherford & Wolfskill's (2011) findings illustrated experiences as secondary students influenced further involvement with topics (like agricultural mechanics) at the post-secondary level. Additional research found pre-service agricultural education teachers' attitudes about agricultural mechanics in secondary agricultural education are likely determinates of the extent to which they pursue courses at the secondary level (Wells, Perry, Anderson, Shultz & Paulsen, 2013). Based on the literature review, a clear emphasis exists on the importance of quality learning experiences in agricultural mechanics curriculum.

Confidence in teaching agricultural mechanics increases with experience; Burris, McLaughlin, McCulloch, Brashears, & Fraze, (2010) compared first and fifth year agricultural teachers' efficacy. They found teachers exerted a higher level of confidence in teaching agricultural mechanics as their time in the lab increased with students. Many teachers relied on their own beliefs and assumptions regarding their definition of successful teaching through prior experiences (Doerfert, 2011). Teacher competence refers to any knowledge, skill or attitude (or any combination) that may enhance teacher performance, which leads to increased teacher effectiveness (Medley & Crook, 1980). In this study, researchers sought to determine if a relationship existed between the quantities of agricultural mechanics training received as secondary students and teacher competency in agricultural mechanics existed.

Theoretical Framework

Bandura's Social Cognitive Theory, in particular, the theory of self-efficacy, was used to guide this study. According to Bandura (1977), self-efficacy is identified as the "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (p. 3). In the enhancement of previously learned behavior, reinforcement acts as a motivational device and self-motivation involves standards against which to evaluate performance (Bandura, 1977). Therefore, people who have more consistent, stable behavior, based on their previous experiences, believe they possess the required competency being evaluated. Efficacy expectations are presumed to influence level of performance by enhancing intensity and persistence of effort until reaching a match to self-prescribed standards (Bandura, 1977). Bandura's theory assists the search to answer the question if the quantity of agricultural mechanics training received at the secondary level ultimately effects teacher competence.

Purpose and Objectives

The purpose of this study was to describe the perceptions of secondary agricultural education teachers concerning personal competence to teach selected agricultural mechanics skills based on the quantity of agricultural mechanics training respondents received at the secondary level. This research purpose aligns with section 2c subsection B of the AAAE national standards for teacher-education in agriculture, which specifically states that teacher candidates need to be competent in agricultural and mechanical systems (Doerfert, 2011). The following objective was identified to address the purpose of this study. Determine if a significant relationship exists between the amount of agricultural mechanics training received at the secondary level and teacher competence.

Methods

This descriptive study used survey research methods to summarize characteristics, attitudes, and opinions to accurately describe a norm (Ary, Jacobs, Razavieh, & Sorensen, 2006). This study is part of a larger study that used a researcher-modified, paper-based questionnaire designed to address the objectives of this study. The instrument contained three sections. Section one included 54 skills related to agricultural mechanics. Skills were separated into five constructs, including: Mechanic Training and Skills, Structures/Construction, Electrification, Power and Machinery, and Soil and Water. Respondents were asked to use a five-point summated rated (Likert-type) scale to rate the perceived personal competency level in teaching each skill. Section two consisted of 15 demographic questions relating to the teacher's educational and teaching background, and section three included nine questions about program and school characteristics.

Content validity was determined by five university faculty members with expertise in the fields of agricultural mechanics and agricultural education. Following the suggestions of Dillman, Smyth, and Christian (2009), the initial electronic version of the instrument was pretested through a pilot study with a group of twelve agricultural education teachers in a nearby state. Suggestions from the pilot study led researchers to adopt a paper-based, rather than electronic instrument. Post-hoc reliability was estimated following the suggestions of Gliem and

Gliem (2003) and resulted in reliability coefficients for competency for both quality and quantity are listed in Table 1.

Table 1
Reliability Coefficient for Both Quality and Quantity Constructs.

Construct	Secondary Level Training α	Teacher Competency α
Mechanic Skills	.963	.948
Structures/Construction	.971	.960
Electrification	.907	.948
Power and Machinery	.968	.975
Soil and Water	.818	.849

Data were collected through a census study conducted during the 2011 Iowa agricultural education teachers' conference. Researchers distributed a questionnaire to each secondary instructor ($N = 130$) in attendance and asked that it be completed by the end of the conference. Each participant was offered a power tool institute safety curriculum as an incentive for completing questionnaire. These efforts yielded 103 usable instruments for a 79.2% response rate. No further effort was made to obtain data from non-respondents. Non-response error was addressed following the suggestions of Miller and Smith (1983) by comparing respondents' personal and program demographic data to data from the Iowa Department of Education (2010). A Pearson's χ^2 analysis yielded no significant differences *(p > .05)* between respondents and the general population of agricultural education teachers in Iowa. However, due to the purposively selected sample, data from this study should be interpreted with care so as not to extrapolate beyond the target population. Data were coded and analyzed using PSAW 18.0.

According to Lehman, O'Rourke, Hatcher, and Stepanski (2005), Spearman correlations can be used "when both variables are numeric and have an ordinal modeling type (level of measurement)" (p. 123). Therefore, Spearman correlations were used in this study to examine potential relationships between the amount of training and skills respondents received at the secondary level and teacher's self-perceived competence level of these skills. Magnitude of the correlations was interpreted using the Davis Convention (1971) and are as follows: those between .01 and .09 were determined negligible, those between .10 and .29 were determined low, those between .30 and .49 were determined moderate, and those between .50 and .69 were determined to be substantial and those .70 or higher were determined to be very strong.

Results

Data concerning the relationship between the amount of training received at the secondary level and teacher competence can be viewed in the Table 2. The results indicated significant positive correlations in 53 of the 54 mechanics skill areas, the only skill with no significant correlation was fencing ($r_s = .128$).

Table 2
Spearman Rho Correlational Relationships between the Quantity of Mechanics Training and Skills Received at the Secondary Level and Teacher Competence

Skill Area	*n*	Spearman Rho Correlation
Oxy-acetylene Brazing	91	.646[*]
Metallurgy and Metal Work	84	.644[*]
Small Engine Safety	85	.643[*]
Cold Metal Work	84	.630[*]
SMAW Welding (Arc)	96	.616[*]
Differential Leveling	75	.381[*]
GMAW Welding (MIG)	94	.373[*]
Tractor Safety	82	.366[*]
Plasma Cutting	91	.306[*]
Fencing	83	.128

Note. [*]$p < .01$

Conclusions and Discussion

As discussed earlier, confidence in teaching agricultural mechanics increases with experience; Burris, et al., (2010) found that teachers are more confident in teaching agricultural mechanics as experience teaching students in the lab increased. Further contemplate the impact teachers' preparation and experience (or lack of) may have on the student experience in the agricultural mechanics classroom and laboratory. Based on the findings of this study we conclude that experience as a student in secondary agricultural mechanics training can add to teaching competence, which in turn may aid in preparing highly qualified teachers with increased confidence to teach agricultural mechanics. As Wells, et al. (2013) posits, a student's experience in secondary agricultural mechanics courses influence their pursuit of post-secondary coursework. Could these correlations illustrate the delicate chain reaction of experiences which all lead to an individual teacher's competency belief? This positive relationship in the quantity of training received and identified self-competence is supported by Bandura's (1977) Social Cognitive Theory; previous experiences factor into perceived performance. Self-efficacy and competency expectations are presumed to impact level of performance by influencing persistence to master said agricultural mechanics skills.

As Burris et al. (2010) noted, agricultural teachers felt less confident teaching agricultural mechanics than any other curriculum area. This study provides another avenue to build confidence is to ensure high quantity agricultural mechanics courses should be delivered on the secondary level. The American Association for Agricultural Education's National Research Agenda calls for research that is needed which clearly illustrates the factors that influence learning which are critical to advance. Graduates of agricultural education programs must be equipped with the understanding and tools necessary to be successful educators (Doerfert, 2011).

Is the quantity of agricultural mechanics training received on the secondary level one of those necessary tools?

Recommendations and Implications

While this study shows that a relationship exists between secondary agricultural mechanics training and teacher competency, it does imply a strong relationship but is not causation. Additional research should be conducted to explore other factors which may impact teachers' competence to teach agricultural mechanics skills. Examining influencers that would weigh the quality of secondary agricultural mechanics training received; participation in career development events or related supervised agricultural experience programs; consideration of the type of skill areas with a higher correlation compared to those with less significant data results; and technological advancements that may impact skill mastery are several of these skills. What additional training and preparation do agricultural mechanics teachers identify as needed to be more competent? Additionally, this research paves the way for other curriculum areas to be examined for similar relationships or is it an exclusive correlation to agricultural mechanics skills and training? What relationships exit between the quality of the secondary agricultural mechanics training received versus receiving a high quantity?

The conclusions of this study lead to implications for teacher education in agriculture. Recruitment of strong, qualified candidates enroll in post-secondary agricultural education program is essential in turning out successful teacher candidates. Examining these results emphasizes the importance of strong agricultural mechanics savvy candidates experiencing a high level of secondary agricultural mechanics training because this ultimately will lead to a more competent teacher. Furthermore, effective teacher training begins in the secondary agricultural mechanics classroom, as secondary agricultural education students. Could retention of motivated agricultural instructors confident in teaching agricultural mechanics skills begin to increase with high quality and quantity of agricultural mechanics courses at the secondary level? Considering these questions provide impact throughout the agricultural education profession. Teachers of agricultural mechanics courses on the secondary level can more confidently reinforce the necessity for students to receive adequate experience and training in mechanics fields. Agricultural teacher education programs can become stronger with more qualified mechanics students that fully experience agricultural mechanics on the secondary level. Teacher education programs and secondary agricultural education teachers need to be aware of the impact that agricultural mechanics skills received at the secondary level can ultimately have on teacher competence.

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The Relationship Between Competency and Adequacy of Tools and Equipment Available to Teach Agricultural Mechanics Skills in Secondary Agricultural Mechanics Laboratories

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Introduction

According to Phipps (1983) agricultural mechanics is an important component of the total secondary agricultural education program. Doerfert (2011) indicated that agricultural education teachers, in order to provide high-quality instruction, must have access to adequate resources. Providing secondary students with adequate opportunities to acquire necessary technical competencies in agriculture is challenging, especially when considering the broad subject area of agricultural mechanics (Burris, Robinson, & Terry, Jr., 2005). Teachers need to be competent in a wide range of topics that could be covered in an agricultural mechanics course.

There is a need for developing competent agriculture teachers in the area of agricultural mechanics. Teachers who do not feel competent, or do not have adequate tools or equipment to teach agricultural mechanics may be providing a disservice to their students. Tschannen-Moran and Woolfolk Hoy (2002) found that the availability of adequate teaching resources negatively affects teacher efficacy. In addition, teachers' sense of self-efficacy may exhibit a dramatic impact on performance (Tschannen-Moran & Woolfolk Hoy, 2002). Several studies have found that teacher self-efficacy is a significant factor in teacher retention (Darling-Hammond, Chung, & Frelow, 2002; Evans & Tribble, 1986). Is there a relationship between agricultural education instructors' level of competency and the lack of adequate tools to teach those content areas?

Theoretical Framework

Bandura's theory of self-efficacy was used to guide this study. Self-efficacy is one's thinking about personal ability to complete a given task and/or goals. Self-efficacy determines how a person reacts and interacts with their surroundings, environment, situation, and people. When teachers feel they have a high sense of self-efficacy in a particular area, they feel confident in sharing that knowledge. Self-efficacy is gained through mastery experiences, physiological and emotional arousal, vicarious experience, and social persuasion (Bandura, 1997).

Purpose and Objectives

The purpose of this study was to describe the perceptions of secondary agricultural education teachers concerning personal competence to teach selected agricultural mechanics skills and the adequacy of tools and equipment available to teach agricultural mechanics. This study aligns with Priority Area 5: Efficient and Effective Agricultural Education Programs (Doerfert, 2011). The following objective was identified to address the purpose of this study: Describe the relationship between the adequacy of tools and equipment available to teach agricultural mechanics and teacher competence to teach agricultural mechanics.

Methods

This descriptive study was conducted as part of a larger study and utilized survey research methods to summarize characteristics, attitudes, and opinions to accurately describe a norm (Ary, Jacobs, Razavieh, & Sorensen, 2006). A paper-based questionnaire was used to address the objectives of this study. Three sections, which included 54 skills relating to agricultural mechanics, formed the instrument. Respondents were asked to use a five-point summated scale to rate the adequacy of available tools and equipment to teach each agricultural mechanics skill, as well as their competency to teach each skill. Section two consisted of 15 demographic questions relating to the teacher, and section three included nine questions about the agricultural education program and various school characteristics.

A team of five university faculty members, with expertise in the fields of agricultural mechanics and agricultural education, determined content validity. Following the suggestions of Dillman, Smyth, and Christian (2009), the initial electronic version of the instrument was pretested through a pilot study with a group of 12 agricultural education teachers in a nearby state. Suggestions from the pilot study led researchers to adopt a paper-based, rather than electronic instrument.

The sample was chosen under convenience sampling guidelines as data were collected from attendees during the 2011 Iowa agricultural education teachers' conference. The purpose behind targeting this sample was based on the likelihood for them to be involved in additional professional development activities in the future. A questionnaire was distributed to each secondary instructor ($N = 130$) in attendance and asked that the questionnaire be completed by the end of the conference. Instruments were returned from 103 of the 130 attendees, which yielded a 79% response rate. No additional efforts were made to obtain data from non-respondents and non-response error was addressed following the suggestions of Miller and Smith (1983) by comparing respondents' personal and program demographic data to demographic data from the Iowa Department of Education (2010). No significant differences *(p < .05)* for gender, age, highest degrees held, years of teaching experience, or size of school community between respondents and the general population of agricultural education teachers in Iowa based on a Pearson's χ^2 analysis. The average agricultural education teacher respondent was a male ($n = 69$, 67%) teacher who taught in a single teacher program ($n = 91$, 90%) in a rural community ($n = 80$, 79.2%), held a Bachelor's degree ($n = 64$, 62.1%), and had less than 15 years of teaching experience ($n = 65$, 63.2%).

Correlation effect size was calculated using a Cohen's *d* (1988) equation. Data were coded and analyzed using PSAW 18.0. Spearman Rho correlations were used in this study to examine potential relationships between the adequacy of tools available to teach agricultural mechanics and the teachers' competency to teach those skills. Due to the purposively selected sample, data from this study should be interpreted with care and not extrapolated beyond the target population.

According to Lehman, O'Rourke, Hatcher, and Stepanski (2005), Spearman correlations can be used "when both variables are numeric and have an ordinal modeling type (level of measurement)" (p. 123). Magnitude of the correlations was interpreted using the Davis

Convention (1971) and are as follows: those between .01 and .09 were determined negligible, those between .10 and .29 were determined low, those between .30 and .49 were determined moderate, and those between .50 and .69 were determined to be substantial and those .70 or higher were determined to have a very strong correlation.

Results

Research objective one, examined the relationship between teacher competence to teach agricultural mechanics and the adequacy of available tools and equipment to teach those skills, utilized Spearman Rho correlations to determine significant ($p<.01$) relationships (see Table 2 through Table 6). Each skill area was correlated within the respective area and not representative of a composite of all sub-constructs. For example, the adequacy of tools and equipment available to teach Electrical Safety skills is correlated to the teacher's competence to teach Electrical Safety. All 54 correlational relationships between tool adequacy and teacher competency to teach a specific skill within the subject were significant at the alpha level ($p < .05$). The items with the highest correlation were electrical safety ($r_s = .723$, $d=.265$), wiring switches and outlets ($r_s = .720$, $d=.257$), and using electrician tools ($r_s = .686$, $d=.686$).

Table 1 displays the mean and standard deviation for the adequacy of available tools to teach specific skills within agricultural mechanics, as well as for the teacher-perceived competency to teach those skills for the 38 skills with the highest correlations. The table is organized to show the respective correlations from highest to lowest.

Table 1

Selected Spearman Rho Correlational Relationships between the Adequacy of Tools and Competency to Teach Skills by Secondary Agricultural Education Instructors

Skills	n	Adequacy M	SD	Competency M	SD	Rho	d
Electrical Safety	83	2.71	1.469	3.08	1.324	.723*	0.265
Wiring Switches and Outlets	86	2.64	1.355	2.98	1.282	.720*	0.257
Electrician Tools	85	2.57	1.361	2.89	1.276	.686*	0.242
Oxy-acetylene Brazing	87	2.85	1.336	2.81	1.228	.645*	0.031
Electricity Controls	84	2.33	1.199	2.58	1.116	.638*	0.215
Construction & Shop Safety	89	3.48	1.262	3.84	1.154	.624*	0.298
GMAW Welding (Mig)	90	3.51	1.170	4.31	0.923	.620*	0.238
Legal Land Descriptions	88	2.78	1.385	3.39	1.207	.608*	0.468
Types of Electrical Motors	81	2.05	1.099	2.43	1.069	.606*	0.350
Metallurgy and Metal Work	80	2.27	1.166	2.51	1.031	.606*	0.217
Plasma Cutting	87	2.98	1.414	3.20	1.170	.580*	0.169
Welding Safety	92	3.66	1.202	3.98	1.130	.567*	0.257
Oxy-propylene Cutting	79	2.03	1.190	2.44	1.239	.560*	0.339
Mechanical Safety	83	2.74	1.373	3.37	1.244	.558*	0.482
Cold Metal Work	80	2.16	1.094	2.36	1.014	.553*	0.190
Soldering	83	2.35	1.176	2.64	1.131	.551*	0.251
SMAW Welding (Arc)	93	3.44	1.241	3.65	1.076	.551*	0.181

Hot Metal Work	81	2.10	1.084	2.29	0.998	.548*	0.182
Oxy-acetylene Welding	93	3.09	1.231	3.25	1.119	.542*	0.142
Small Engine Safety	85	2.88	1.392	3.37	1.231	.538*	0.369
Service Machinery	82	2.13	1.120	3.01	1.297	.536*	0.725
Bill of Materials	88	3.26	1.236	3.62	1.108	.535*	0.306
Power and Machinery Safety	85	2.46	1.332	3.26	1.361	.529*	0.595
Machinery Operation	83	2.13	1.113	3.03	1.243	.521*	0.765
Tool Conditioning	79	2.29	1.105	2.52	1.075	.516*	0.210
Survey Equipment	84	2.15	1.266	2.67	1.060	.513*	0.445
Pipe Cut. And Threading	77	2.04	1.160	2.49	1.147	.507*	0.390
Oxy-acetylene Cutting	93	3.30	1.190	3.51	1.091	.506*	0.184
Cleaning Motors	76	1.94	1.073	2.35	1.027	.505*	0.390
Profile Leveling	75	1.79	1.017	2.23	0.981	.499*	0.429
Construction Skills	87	3.14	1.250	3.38	1.221	.498*	0.194
Fasteners	85	2.79	1.196	3.11	1.217	.493*	0.195
Global Positioning Systems	85	2.27	1.219	2.89	0.924	.486*	0.574
Tractor Maintenance	82	2.09	1.113	3.07	1.300	.485*	0.776
Tractor Selection	79	1.94	1.004	2.77	1.108	.480*	0.786
Wood Working Power Tools	89	3.43	1.196	3.74	1.047	.479*	0.275
Computer Aided Design	76	2.00	1.012	1.99	1.125	.473*	0.009
Machinery Selection	81	2.11	1.095	2.89	1.215	.472*	0.672

Note. *p <.05

Conclusions, Implications, and Recommendations

The purpose of this study was to determine if there was a relationship between the adequacy of respondents' tools and equipment available to teach agricultural mechanics skills and the teachers' perceived competency to teach agricultural mechanics topics in a high school agricultural education program in Iowa. It can be concluded that there is a lack of adequate tools and competent teachers to teach several subjects within agricultural mechanics. Teacher retention may pose a serious issue from these findings. Teacher self-efficacy is a significant factor in teacher retention (Darling-Hammond, Chung, & Frelow, 2002; Evans & Tribble, 1986). If agricultural educators are not afforded adequate resources to teach subjects that are important or appropriate for their particular program, they may seek job opportunities elsewhere. Similar studies should be conducted in order to examine if this issue is prevalent in other states.

Agricultural education instructors should have a variety of opportunities available to aid in further developing their competency in agricultural mechanic areas. With current degree and program of study requirements, it is difficult for preservice teachers to gain adequate technical competence in agricultural mechanics (Burris, Robinson, & Terry, Jr., 2005; Robinson, Krysher, Haynes, & Edwards, 2010). Degree requirements could be altered or allow for flexibility for preservice candidates who desire to gain more technical competence in the area of agricultural mechanics. In addition, training opportunities for inservice teachers would allow for further competency development.

Classroom management issues may be more prevalent when there is a lack of adequate tools for the entire class. When there are not enough tools for the entire class, additional preparation is required. Teachers need to create other activities for students while the tools are in use. Agricultural education instructors should consider forming cooperatives for tool sharing. This would allow for teachers involved to have the tools they needs to teach specific skills within agricultural mechanics. The cooperative would allow for teachers to offer a variety of classes to meet student interest without a large initial investment needed for tools.

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Does the Quantity of Agricultural Mechanics Training Received At The Secondary Level Impact Teacher Perceived Importance to Teach Agricultural Mechanics Skills?

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Introduction

Within the United States, the inclusion of agricultural mechanics courses has become popular among secondary students (Anderson, Velez, & Anderson, 2011). Narrowing the view to Iowa, a study done by Rudolphi and Retallick (2011) found nearly 90% of current agricultural education instructors had taught an agricultural mechanics course. With the popularity of agricultural mechanics comes the task of determining what skills to teach within those courses. Secondary agricultural education programs in Iowa have local control affording teachers the ability to develop curriculum based on student and community needs (Iowa Department of Education, 2011). The question that needs to be asked is; what factors influence an agricultural mechanics instructor's decision to determine what should be taught in their program?

The teaching of agricultural mechanics courses in pre-service teacher training institutions has been on the decline, leading to a need for in-service training in this area (Burris, Robinson, 2005). Wells, Perry, Anderson, Shultz, and Paulsen (2013) reported 54 mechanics skills that agricultural education teachers indicated were appropriate for secondary agricultural mechanics courses. The large number of skills deemed appropriate for agricultural mechanics highlights the broadness of the subject. This range of skills also adds to the complexity of choosing what is important, and makes it difficult for novice teachers to be adequately prepared to teach those skills. Teachers are not always adequately prepared or comfortable teaching the agricultural education courses a community perceives as important (Shelley-Tolbert, Conroy, & Dailey, 2000).

As the world around us changes, the value of the different agricultural mechanics skills identified will continue to be altered and teachers must be prepared for what changes may occur. As technology changes, the need for schools and teacher education programs to evaluate their curricula will increase (Duncan, Ricketts, Peake & Uesseler, 2006). Agricultural mechanics has not avoided the need for change, and the need to continue to change remains (Laird, 1994). Pre-service teacher education provides vital experience to those that will become secondary instructors. More than just the experience gained, that knowledge influences values and beliefs in regards to the content they are learning (Fishbein, 1967).

As noted by Ford (2006) many current teachers received little to no training in agricultural mechanics from their pre-service programs. Other than knowledge gained through pre-service education or in-service education programs, most agricultural mechanics teachers have experienced courses involving agricultural mechanics skills while they were secondary students. Many post-secondary agricultural education students were drawn to the field through their experiences as secondary students. Connors (1998), discussed the important role secondary educators have in recruiting post-secondary agricultural education students. Knowing that knowledge influences beliefs (Fishbein & Ajzen, 1975) how does the knowledge gained through

a current teacher's secondary training effect their perceived importance of different agricultural mechanics skills? Does the amount of training they received while they were secondary students effect their current beliefs?

Theoretical Framework

The theoretical framework guiding this study is Vygotsky's social development theory. There are three key points in the social development theory: the More Knowledgeable Other (MKO) role provides much of the social and cognitive development, the Zone of Proximal Development (ZPD) indicates where a learner is with regards to being able to perform task with or without guidance, and social experiences form a foundation for cognitive development, (Vygotsky, 1978).

The MKO is any entity with a higher level of knowledge regarding a particular topic than the learner. The MKO could be a teacher, another student, computer software, online media sources, or any source of knowledge. The influence of the MKO is limited by the ZPD. The ZPD is the level at which a learner is capable of reaching. In a sense, the ZPD defines the limits of learning achievable by a student. What makes the ZPD important is when content is taught at a level outside of the learners capabilities.

The third piece to the social development theory is the social experiences forming a foundation for cognitive development. Vygotsky (1978) indicated that "every function in the child's cultural development appears twice; first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)" (p. 57). The agricultural mechanics skills received at the secondary level align with the students' interpsychological development on the social level due to their proximity to the instructor and other students. The teacher's perceived level of importance of agricultural mechanics skills is aligned to the intrapsychological development, which emerged as a result of their interpsychological foundation. This lead the researchers to consider if the agricultural mechanics skills received at the secondary level impacts teachers' perceptions of what agricultural mechanics skills are important to teach.

Purpose and Objectives

The purpose of this study was to determine if the quantity (number of courses) in agricultural mechanics training received at the secondary level impacts teacher perceived importance of the agricultural mechanics skills that they teach at the secondary level. This research aligns with section 2c subsection B of the AAAE national standards for teacher-education in agriculture, which specifically states that teacher candidates need to be competent in agricultural and mechanical systems (Doerfert, 2011). The following objective was identified to address the purpose of this study: Describe the relationship between teacher perceived importance of agricultural mechanics skills and the quantity of agricultural mechanics training received at the secondary level.

Methodology

This study utilized descriptive research methods to summarize characteristics and attitudes of a norm (Ary, Jacobs, Razavieh, & Sorenson, 2006). The population consisted of 130 Iowa secondary agricultural educators that attended the Iowa agricultural education teachers' conference. A print based survey was distributed to the 130 secondary agricultural education teachers at the teacher's conference. Of the 130, ($n = 103$) surveys were returned for a response rate of 79.2%. We examined the relationship between the quantity of agricultural mechanics training received at the secondary level and the teachers' perceived level of importance to teach agricultural mechanics skills. PASW Statistics 18 was used to analyze Spearman Rho correlations to determine if any significant ($p < .05$) relationships existed. It should be noted that each skill area was correlated within the respective area and not representative of a composite of all sub-constructs. For example, Electrical Safety received at the secondary level is correlated to perceived importance to teach Electrical Safety.

Results/Findings

Thirty-two of the 54 skills taught in secondary schools had a significant relationship with the teachers' viewed importance of teaching those same skills. Looking more specifically at each construct; 13 of 19 skills in mechanics training showed significant correlation, eight of nine construction skills showed significant correlation, three of six electrical skills showed significant correlation, seven of 15 power and machinery skills showed significant correlation, and one of five soil and water content skills showed a significant correlation. The five highest correlations are included in Table 1; and include woodworking power tools, oxy-acetylene brazing, legal land descriptions, small engine services- 2 cycle, and wiring skills (switches & outlets).

Table 1
Spearman Rho Correlational Relationships between the Quantity of Agricultural Mechanics Training and Skills Received at the Secondary Level and Teachers Perceived Importance

Skill Area	n	Spearman Rho Correlation
Woodworking Power Tools	91	.473**
Oxy-acetylene Brazing	91	.437**
Legal Land Descriptions	83	.429**
Small Engine Services - 2 Cycle	83	.340**
Wiring Skills (Switches & Outlets)	89	.320**

Note. **$p < .05$

Conclusions/Implications/Recommendations

Skills with the highest correlation are skills that were heavily used in industry in decades prior to today and are still in significant use today. Under the mechanics training construct for example, the oxy-acetylene brazing and pipe cutting and threading were the two highest correlating skills. These are two skills that are currently commonly used and have been commonly used for a long time in industry. The same effect can be seen in the structure and construction skill construct. The top two correlating skills in this construct were woodworking power tools and construction skills. Both of these skills are, and have been, extremely important to industry. We conclude that the content current teachers learned as secondary students due to the content's relevancy at the time is now what they are teaching today.

We also conclude that certain correlations were low due to a change in content relevance over time. For example, one of the lowest correlating skills in the mechanics training construct is fencing. In past decades, farm sizes were generally smaller and livestock pastures were more common. Today we see larger farm sizes with less land devoted to pasture, reducing the need for fences to contain livestock.

More than half of the skills surveyed showed significant correlation between teachers' perceived importance to teach specific agricultural mechanics skills when compared to the quantity of secondary retraining they received with those skills. We conclude that the findings from this study support Vygotsky's (1978) social development theory. The content teachers were exposed to in the social setting (as students), has reemerged intrapsychologically today in their teaching. This can be seen evidently in the examples of oxy-acetylene brazing and woodworking power tools. While current teachers were still secondary students they were being exposed to these skills in a social setting. They were learning from interactions with their instructors and their peers. The people around them acted as the more knowledgeable others and they were able to learn through those observations and interactions with them. While in those courses, their zones of proximal development were being maximized to take them beyond their current level of ability in the skills being taught.

Experience at the secondary level has an impact on content teachers view as important; post-secondary teacher educators and industry should continue to help beginning teachers receive additional training and support in agricultural mechanics at the local level. Something these results may allude to is the tendency for educators to become stuck in a pattern with their content. Some of the significantly correlating skills may be the result of an educator teaching a skill simply because it is what they were taught and with which they have become comfortable. If they are teaching skills based more on a level of comfort than on an industry need for employable skills, they are wasting the time of their students, and they are wasting the resources of the school. The education system as a whole should be in constant state of evolution to ensure they are teaching the skills that are needed not only in the present, but are preparing students with the skills they will need in the future.

It should be noted that limitations within this study may exist including a teacher's ability to remember the content they learned in high school, if in fact they were actually exposed to agricultural mechanics in the secondary level, and if the technology existed when the participants were enrolled in an agricultural mechanics course. This census was conducted among teachers from the Iowa Agricultural Education Teachers' Conference, which limits the generalizability to that state. However, this study may have an impact in areas outside of Iowa with an interest in agricultural mechanics.

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Student Perceptions of their Experience in a Flipped Undergraduate Capstone Course

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Introduction

Flipped learning is a relatively new method being used in higher education that has been shown to promote increased student engagement and motivation (Tucker, 2012). Flipped learning utilizes a restructuring of content delivery methods (lectures, presentations, & readings) traditionally delivered in face-to-face settings by requiring student completion prior to class (Rosenberg, 2013; Tucker, 2012). Doerfert (2011) posits that meaningful and engaged learning in all environments is essential for the success of 21st century learners.

Team Based Learning is a teaching method which integrates a flipped approach and relies heavily on the use of small groups with the purpose of transforming them into high performance learning teams (Michaelsen, Knight, & Fink, 2004). Neider, Parmalee, Stolfi, and Hudes (2005) posited that TBL is a very active type of learning process that aids students in acquiring factual materials as well as in developing higher-level cognitive skills. The call for instructors to meet societal needs pertaining to critical thinking and effective communication is of paramount importance (Perry, Retallick, and Paulsen, 2014).The aforementioned benefits are initiated by implementing strategies to ensure student accountability for content delivered in a flipped scenario. The five step Readiness Assurance Process (RAP) is integrated within TBL and includes; a) pre-class preparation, b) individual assessment, c) team assessment, d) appeals, and e) oral feedback (Michaelsen et al., 2004). Pre-class preparation includes viewing online lectures or presentations, and reading reference materials prior to participating in the face-to-face class setting. Students are assessed individually over the pre-class content, and again as a team immediately after the individual test. Michaelsen et al. (2004) observed robust student conversation during implementation of the team test which served as a natural segue into application exercises where students apply the newly acquired content toward complex, real-world problems or situations (Michaelsen et al., 2004).

AgEdS 450 at Iowa State University provides students with a capstone experience in the management and operation of a real, working farm (Murray, 1945). The tenats of a capstone course as outlined by Crunkilton, Cepica, and Fluker (1997) are followed and include an emphasis on teamwork, communication, decision-making, problem-solving, and critical thinking. Students are tasked with making decisions relevant to a working farm (i.e., seed selection, fertilizer plans, and building and safety audits) (McCubbins, 2014). In order to meet the needs of a diverse student population and further attempts to promote active learning, TBL was implemented into AgEdS 450 in the fall of 2014.

Purpose and Objectives

In order to assess student satisfaction of the flipped AgEdS 450 at Iowa State University, the purpose of this study was to determine student perceptions of the effectiveness of TBL.

The following objectives were identified to fulfill the purpose of this study.

1. Describe student perceptions related to to their beliefs and attitude about individual learning and group learning.
2. Describe student's perceptions of professional development skills through critical thinking.
3. Describe student's motivations to learn.

Theoretical Framework

Mezirow's transformative learning theory served as the theoretical framework for this study. Transformative learning theory is defined as "the process of effecting change in a frame of reference" (Mezirow, 1997, p. 5). Mezirow further stated that for learning to be meaningful, new information acquired by learners should be incorporated into "an already well-developed symbolic frame of reference, an active process involving thought, feelings, and disposition" (p. 10). Learners draw from and build upon previous experiences in a transformative learning experience. In order to foster learner self-direction, the educator becomes the facilitator and emphasizes problem-solving groups in which students learn from one another (Mezirow, 1997).

Methods

As part of a larger study, student perceptions of TBL in a capstone course were sought. An electronic questionnaire developed by Bickelhaupt and Dorius (2014) was distributed to all students enrolled in AgEdS 450 during the fall of 2014 ($N = 57$). Three constructs guided the survey and included: 1) beliefs and attitudes about learning, 2) motivation to learn, and 3) professional development. The instrument consisted of: 35 Likert-type questions and two open-ended questions for feedback on the course structure. The fourth section included four demographic questions requesting age, transfer status, GPA, and gender. Content and face validity was established by a panel of experts in survey design and TBL. The instrument was tested in other TBL courses ($n = 397$) at Iowa State University to measure reliability. Following the suggestions of Urdan (2012), the pilot study resulted in construct reliability coefficients deemed acceptable ($\alpha = 0.84 - 0.92$). Usable instruments in the present study were collected from respondents ($n = 48$) for an 84.2% response rate. This study is limited to the respondents who participated as their perceptions are specific to a homogenous sample in AgEdS 450. However, results may provide insight to those interested in utilizing TBL in capstone courses at other institutions.

Results

Student perceptions regarding the course and each construct were overwhelmingly positive. Data from Table 1 identifies the student perceptions within the Motivation to Learn construct. The majority of students (95.8%) reported their teams working well together throughout the semester.

Table 1

Student Perceptions of their Motivation to Learn in a TBL Formatted Course (N=57)

	n	SA/ A f(%)	N f(%)	D/ SD f(%)
During this course, my team and I have worked well together.	48	46(95.8)	1(2.1)	1(2.1)
I made sure I kept up with the weekly readings and assignments for this course.	46	40(87.0)	4(8.7)	2(4.4)
The members of my team maintained high standards of performance.	48	35(72.9)	6(12.5)	7(14.6)
I have found that my team has motivated me to work more collaboratively in this course.	47	34(72.3)	11(23.4)	2(4.3)
The members of my team encouraged each other to give their best efforts.	48	34(70.9)	7(14.6)	7(14.6)
I have found that my team has motivated me to work harder in this course.	48	31(64.6)	9(18.8)	8(16.7)
I believe I could have done more to receive the grade I wanted in this course.	46	28(60.8)	8(17.4)	10(21.7)

Note. Construct Grand Mean = 4.93. Construct SD = 1.02.
1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree

Table 2 reports findings within the Professional Development construct. Students reported that working with their team to solve problems was an effective method for this course. The lowest rated item within the Professional Development construct related to students experimenting with ideas of their own as it related to course content, but was still highly regarded ($f = 33,$ 71.8%).

Table 2

Student Perceptions of their Professional Development in a TBL Formatted Course (N=57)

	n	SA/ A f(%)	N f(%)	D/ SD f(%)
Solving problems in a group was an effective way to apply what I have learned.	47	41(87.3)	5(10.6)	1(2.1)
Being part of a team discussion has improved my ability to think through a problem.	46	39(84.8)	3(6.5)	4(8.7)
I was given the appropriate resources to do well in this course.	47	37(78.7)	3(6.4)	7(14.9)
I have found that being part of a team has helped to challenge previous ideas and improve my learning.	48	37(77.1)	5(10.4)	6(12.5)
I have found that being on a team has helped me become better at problem solving.	48	37(77.1)	4(8.3)	7(14.6)
Whenever I read or heard a statement or conclusion in this course, I thought about possible alternatives.	47	36(76.6)	8(17.0)	3(6.4)

I treated the course material as a starting point and tried to develop my own ideas about it.	47	35(74.6)	6(12.7)	6(12.7)
When a theory, interpretation, or conclusion was presented in class or in the readings, I tried to decide if there was good supporting evidence.	47	34(72.4)	10(21.2)	3(6.4)
I tried to play around with ideas of my own related to what I was learning in this course.	46	33(71.8)	7(15.2)	6(13)

Note. Construct Grand Mean = 4.99. Construct SD = 1.06.
1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree

Table 3 displays the items regarding student perceptions of their Attitudes and Beliefs about Learning. Eighty-nine percent of respondents believed their grade improved from being on a team, that they would receive an excellent grade that they could perform independently from the knowledge gained from the course, as well as being confident in understanding the basic concepts covered in the course.

Table 3

Student Perceptions of their Attitudes and Beliefs about Learning in a TBL Formatted Course (N=57)

		VT/ M	N	S/ NT
	n	*f(%)*	*f(%)*	*f(%)*
I believe that being part of a team has improved my grades in this course.	46	41(89.1)	2(4.3)	3(6.5)
I expect that I will receive an excellent grade in this course.	46	41(89.1)	3(6.5)	2(4.4)
I believe I can perform independently with the knowledge I have gained in this course.	46	41(89.1)	3(6.5)	2(4.4)
I am confident I can apply the knowledge I have learned in this course in future tasks	46	41(89.1)	3(6.5)	2(4.4)
I am confident I understood the basic concepts taught in this course.	46	41(89.1)	4(8.7)	1(2.2)
I am confident I did an excellent job on the assignments and tests in this course.	46	39(84.8)	2(4.3)	5(10.9)
I believe solving problems in groups has led to better decisions than solving problems on my own.	46	38(82.7)	2(4.4)	6(13)
I am certain I grasped the skills that were taught in this course.	46	38(82.6)	5(10.9)	3(6.5)
When I studied in appropriate ways, I was able to learn the material in this course.	46	37(80.4)	6(13)	3(6.5)
I am certain I understood the most difficult material presented in the readings for this course.	46	36(78.3)	4(8.7)	6(13)
I believe solving problems in a group was an effective way for me to learn.	46	36(78.3)	4(8.7)	6(13)
The ability to work with my peers in this class was a valuable experience for me.	46	36(78.3)	3(6.5)	7(15.2)
The ability to collaborate with my peers was necessary for me to be a successful student in this class.	46	34(74)	7(15.2)	5(10.9)

If I tried hard enough, then I understood the course material.	46	34(73.9)	11(23.9)	1(2.2)
Collaborating with my peers helped me to be a better student.	46	31(67.4)	9(19.6)	6(13)
Working in teams in class has been a productive way for me to spend class time.	46	30(65.3)	7(15.2)	9(19.6)
It was my own fault if I didn't learn the material in this course.	46	25(54.4)	12(26)	9(19.6)
If I didn't understand the course material, it was because I didn't try hard enough.	46	21(45.6)	12(26.1)	13(28.3)

Note. Construct Grand Mean = 4.99. Construct SD = 1.04.

1 = Not at All True of Me, 2 = Sometimes, 3 = Neutral, 4 = Mostly, 5 = Very True of Me

Conclusions/ Implications/ Recommendations

Based on the findings of this study, it can be concluded that student experiences in a TBL formatted course are overwhelmingly positive for AgEdS 450 at Iowa State University. The process of flipping a course into TBL format is a time consuming process (Michaelsen, Sweet, & Parmalee, 2011), and student satisfaction is an important component in the continuous revision of AgEdS 450. These conclusions have implications for higher education as TBL may provide a more engaging learning environment for students in capstone courses (Michaelsen, Sweet, & Parmalee, 2011). Doefert (2011) calls for more engagement in all learning environments in order to meet the needs of 21st century learners; the TBL pedagogy may be able to answer that plea. Examining the effect of flipping other courses within Colleges of Agriculture to the TBL format would be beneficial. The data could also be useful in order to defend the inclusion of the TBL pedagogical practice in more post-secondary institutions, specifically courses within Colleges of Agriculture. The findings within the professional development construct may provide implications for the buzz around critical thinking. Perry, Retallick, and Paulsen (2014) call for the increase in teaching critical thinking skills, and the TBL pedagogical practice could potentially prove to be valuable in increasing the critical thinking skills of students across the curriculum.

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