An Assessment of the Animal Science Technical Skills Secondary Agricultural Education Graduates need for Employment in the Animal Science Industry: A Delphi Study

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Abstract

Career and technical education courses, such as agricultural education, exist, in part, to assist students in acquiring the competencies needed to achieve employability in the workforce. However, a lack of available research leads one to wonder if the current secondary agricultural education curriculum is meeting the needs of industry leaders who employ high school graduates of agricultural education programs. Therefore, this Delphi study sought to identify the technical competencies deemed necessary for entry-level employment of high school graduates in the animal science industry on their successful completion of coursework in the animal systems career pathway. Forty-two experts, representing the animal science industry in Oklahoma, participated in the study. In all, 133 competencies were yielded, revealing 48 different statements. Specifically, panelists "strongly agreed" that graduates should be able to "use basic math," "practice farm safety," and "understand animal needs." Because all 48 statements comprised the "real limits" of "agreement" (M = 2.50 – 3.49), it can be concluded that these skills should be included in the curriculum designed for the animal systems pathway component, and cross-walked with the current Oklahoma secondary animal systems career pathway to ensure that students enrolled in animal science are provided opportunities to learn the skills employers seek.

Introduction

Our nation is facing a dilemma. An "unprecedented shortage of skilled workers" (Gray & Herr, 2006, p. 17), which is projected to lead to a 5% decrease in our nation's gross domestic product is predicted. Previous research by Gray and Herr showed that 30% of high school graduates seeking employment were not provided the necessary skills in high school, which has resulted in high unemployment rates of high school graduates (College Enrollment and Work, 2008). Even though the number of students pursuing post-secondary education has increased over time, a large number of American high school graduates seeking employment following completion of secondary education still exists (College Enrollment and Work).

Although high school graduates are seeking employment, our nation faces the compounding issue of a shortage of skilled workers because "baby boomers" are retiring at an alarming rate. This condition is creating a rapid depletion of employees in the job market, thus, prompting a massive need to fill these vacated positions (Carnevale, 2003). The term "baby boomer" refers to those individuals who were born between 1946 and 1964 (Kamalick, 2007). According to Kamalick, the "wave of Boomer retirees will take on biblical proportions in 2012,

when the first Boomers achieve 66 years and become eligible for full retirement benefits" (p. 14).

Additional changes in the employment sector are occurring simultaneously with the retirement of baby boomers. These changes include jobs which require at least some technical training or post-secondary education (Carnevale). Ellwood (2001) projected that, although our workforce has seen an increase in employers by 35% in the past 20 years, the combination of job market shifts will cause employment growth to slow to 16% over the next decade, which will result in an even greater shortage of workers. In fact, Carnevale projected that an increase of at least 20 million workers will be needed in the United States job market over the next 20 years.

The "New Basics" curriculum presented in *A Nation at Risk: The Imperative For Education Reform* (1983), represented the idea that "high school curriculum should also provide students with programs requiring rigorous effort in subjects that advance personal, educational, and occupational goals, such as the fine and performing arts and vocational education [i.e., Career and Technical Education]" (p. 20). Career and technical education (CTE) programs provide students with entry-level competencies for careers (Lynch, 2000). However, controversial legislative acts, such as NCLB, "seem most likely to ignore these kids [who are not pursuing post-secondary education] or even to justify their neglect and the elimination of programs – such as high school CTE – that could serve them by providing occupational skills that pay well and are in demand" (Gray & Herr, p. 12). Further, Castellano, Stringfield, and Stone III (2003) stated, "although many argue that preparation for jobs should be concentrated primarily in the postsecondary phase of students' lives (e.g., in community and technical colleges), many students are developmentally ready to prepare for occupations at earlier ages" (p. 245).

Cohen and Besharov (2002) identified that 93% of public schools in the United States offer one or more courses under the CTE umbrella. Beyond general introductory courses, areas of specialization are offered to students with specific industry interests. CTE programs experienced a steady increase in enrollment until the early 1980's (Cohen & Besharov; Lynch). However, from 1982 to 1994, a sudden decline in enrollment numbers occurred. Reasons for the decline ranged from the lack of CTE programs meeting the needs of students to an increase in college preparatory classes (Lynch).

Findlay (1993) surmised that regardless of the profession, "competence in one's professional work role is important in the overall learning process" (p. 46). Further, Stanford (2002) concluded, "involvement in career oriented education programs at the high school level can give students the experience needed to help with career placement once leaving the school setting" (p. 1). Therefore, providing a curriculum in which students can acquire technical skills is essential because preparing for the workforce "should begin sometime in high school" (Lynch, p. 7).

Efforts have been made to reform CTE curriculum to include more "rigorous industry standards, and higher academic standards and related general education knowledge" (Lynch, p. 3). The purpose of the *Carl D. Perkins Career and Technical Education Improvement Act of 2006* (Perkins IV) was to "develop more fully the academic and career and technical skills of

secondary education students and postsecondary education students who elect to enroll in career and technical education programs" (p. 683), which allows students enrolled in CTE the opportunity to train for the workforce and prepare for college simultaneously (Roberts & Ball, 2009). Additionally, it parallels themes intended to be addressed by education, including preparation for high skill, high wage, high demand careers, and the integration of academic and technical education. Further, it strengthens America's workforce to be competitive in the global economy (Martinez Jr., 2007).

To ensure students are provided opportunities to acquire the needed skills to be competitive in the workforce, CTE has endorsed the use of the 16 Career Clusters (Ruffing, 2006). Career clusters are "groupings of occupations/career specialties" (Oklahoma Career Clusters Initiative, 2008) manifested by career pathways, which provide knowledge and skills for their respective career cluster. The purpose of the 16 Career Clusters is to address the needs of increasing integration of standards from both academia and industry while encompassing curricula changes and tools for measuring assessments of the program concurrently (Ruffing).

In response to the 16 Career Clusters created by the National Association of State Directors for Career Technical Education Consortium (NASDCTEC) (2008), Oklahoma agricultural education implemented curriculum standards based on the 16 Career Clusters into its programs in 2006. This inclusion sought to "ensure that Oklahoma agricultural education student's [would] have the skills and abilities to be successful in college or successful in the workplace" (Oklahoma Education, 2007b).

Seven total career pathways were created for the Agricultural, Food, and Natural Resource career cluster consisting of agribusiness systems; animal systems; environmental service systems; food products and processing systems; natural resource systems; plant systems; and power, structural and technical systems. In addition to these seven pathways, students can be administered competency examinations in their respective areas to determine the success the program had on preparing them for the workforce in that particular career pathway. These examinations provide information for future employers to assess potential employees' abilities within their chosen career of study and their readiness for employment.

Career clusters are one answer to the changes and demands detected in the agricultural industry and agricultural education, a component of CTE. Thompson and Balschweid (1999) reported that "increased high school graduation requirements have pressured agricultural programs by limiting opportunities for students to enroll in elective courses" (p. 73). Further, "in 1988, the National Research Council recommended that agricultural courses be expanded to increase the rigor of scientific and technical content to better prepare students for advanced study and employment" (Warnick, Thompson, & Gummer, 2004, p. 62). Additionally, it was concluded that the integration of science in agricultural education classes produced a positive impact on students' test scores on standardized tests (Chiasson & Burnett, 2001; Thompson & Balschweid).

The teaching of science in agricultural classes, or agriscience as it is called in many states, is a concept that has been around for nearly 100 years (Warnick & Thompson, 2007). To enhance visibility, programs across the United States have begun offering science credits to

students taking approved agricultural education courses (Chiasson & Burnett). Budke (1991) postulated that "agriculture provides a marvelous vehicle for teaching genetics, photosynthesis, nutrition, pollution control, water quality, reproduction, and food processing where real life examples can become part of the classroom experimentation and observation" (p. 4). The concept of integrating the two subjects could produce a more effective way of teaching science (Warnick et al., 2004). Science and agriculture are integrated in the animal systems career pathway, which is one of seven pathways offered in Oklahoma agricultural education programs.

This study was based on the supposition of the Human Capital Theory. Human capital is a form of increasing one's employability due to increased education and training (Becker, 1964; Shultz, 1971). According to Little (2003, p. 438),

> The propositions of human capital theory were that the skills that people acquire are a form of capital, human capital; that these are acquired through deliberate investments in education; that skills are the capacities that contribute to economic production; and that earnings in the labour market are the means by which a person's productivity is rewarded.

Schultz stated, "education has become a major source of economic growth in winning the abundance that is to be had by developing a modern agriculture and industry" (p. 56). Becker further explained that "many workers [and students] increase their productivity by learning new skills and perfecting old ones while on the job [or through work-experience programs]" (p. 9).

In line with the human capital theory, Roberts and Ball (2009) developed a conceptual model to provide an understanding of the role of the 21st century agricultural industry plays in agricultural education programs (Figure 1). Based on the model, curricula utilized in agricultural education courses should reflect the needs of the industry. Therefore, teachers must "stay current in the technical content of the profession [i.e., agricultural industry]" (Talbert, Vaughn, Croom, & Lee, 2007, p. 57) because the agricultural industry "provides the basis for the curricula taught and for teacher preparation" (Roberts & Ball, p. 83). Moreover, instructors should "provide industry-relevant instruction that results in observable skill acquisition" (p. 83). The end result is for students to acquire skills and competencies which enable them to gain successful employment.

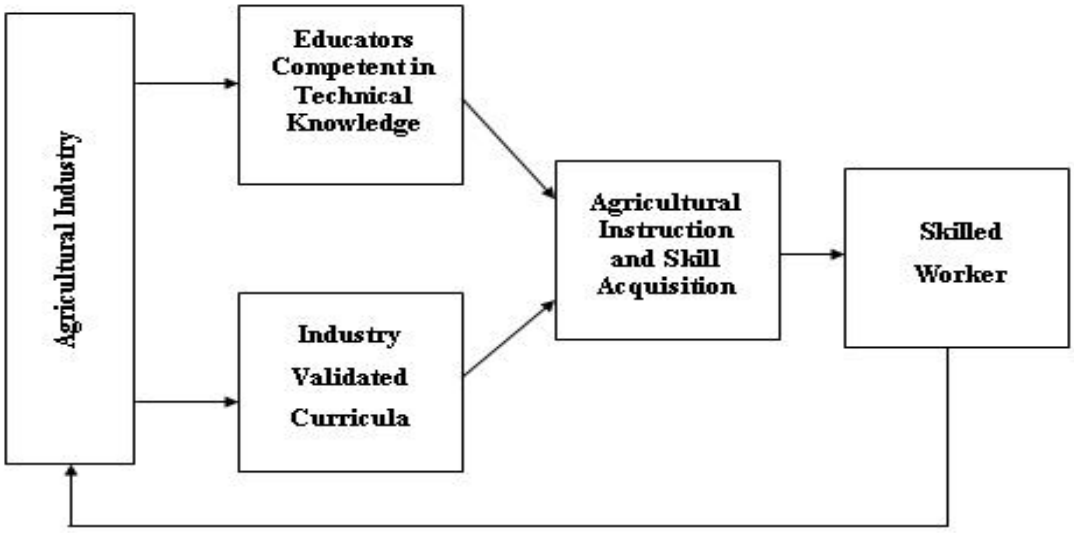

Figure 1. A content-based model for teaching agriculture (Roberts & Ball, 2009).

Although it preceded the Roberts and Ball model, NASDCTEC created the 16 Career Clusters designed to assist students in achieving skills needed for employability in specific career-oriented subject areas. This includes the Agriculture, Food, and Natural Resources cluster, which contains an animal science career pathway (Oklahoma Career Clusters, n.d.). The pathway allows for a sequence of courses to be completed by students interested in pursuing a career or post-secondary education in animal science. Further, the career pathway serves as a vehicle for curriculum delivery which could include competencies necessary for entry-level employment of students in the animal agriculture industry following their high school graduation.

Statement of the Problem

To a degree, career and technical education exists to provide the necessary tools and skill sets for successful student employment in the agricultural industry (Phipps & Osborne, 1988). However, a lack of available research leads one to wonder if the current curriculum, such as the 16 Career Clusters followed in Oklahoma, is meeting the needs of agricultural industry leaders who employ high school graduates of agricultural education programs. If students do not acquire these competencies deemed necessary by employers, they decrease their probability of employment in the future, thus, increasing the number of unemployed high school graduates in the United States (College Enrollment and Work, 2008; Gray & Herr, 2006).

Purpose/Objective

The purpose of this study was to describe the perceptions of Oklahoma animal science industry leaders as it related to competencies necessary for the entry-level employment of high school graduates who had completed coursework in the Oklahoma Agricultural, Food and Natural Resources, animal systems pathway. Therefore, the objective of this Delphi study was to

identify the technical competencies deemed necessary for entry-level employment of high school graduates in the animal science industry on their successful completion of coursework in the animal systems career pathway.

Methods

The Delphi technique was employed for this study. Specifically, the Delphi technique accumulates responses from a panel of experts within a given content specialization area until consensus is reached (Delp, Thesen, Motiwalla, & Seshadri, 1977; Stitt-Gohdes & Crews, 2002). Further, "the Delphi technique is a method of eliciting and redefining group judgments" (Dalkey, 1969, p. V) in which anonymity, controlled feedback, and statistical group response are the norm. Stewart (2001) affirmed that the knowledge gained from professional educators using the Delphi technique is extremely useful in uncovering information that is often not verbalized.

The population for this study was Oklahoma animal science industry experts from nine areas of specialization: beef cattle; dairy; equine; goat; implements/miscellaneous; poultry; sheep; swine; and veterinarians. Stitt-Gohdes and Crews stated that, "careful selection of the panel of experts is the keystone to a successful Delphi study" (p. 60). Therefore, panel members were selected using a purposive sampling technique. According to Gay, Mills, and Airasian (2006), a purposive sampling "is the process of selecting a sample that is believed to be representative of a given population" (p. 113).

A sample population of (n = 42) was obtained for the study. A professor of animal science, Department of Animal Science, Oklahoma State University suggested panel members based on personal and professional interactions. The criterion used for selecting individuals was based on their prior experience and knowledge of the industry as it pertained to employment, including entry-level employees. For example, only those individuals who had previously hired or would consider hiring high school graduates were considered for this study. Additionally, all experts who served on the panel were affiliated with the animal science industry in the state of Oklahoma. Finally, only those individuals who had access to the Internet and could respond to the questionnaire via electronic mail (e-mail) were considered as panel members because a computer version of the Delphi technique "has the advantage of eliminating the delay caused in summarizing each round of Delphi . . ." (Turoff & Linstone, 2000, p. 5).

Dalkey stated that when a Delphi group is larger than thirteen members, a reliability of at least .80 can be achieved. Of the 42 participants selected to participate, 32 responded in Round One for a 76.2% response rate. Round Two returned 26 respondents for a 61.9% response rate. Finally, in Round Three, 24 participants responded for a 57.1% response rate. As such, reliability was maintained throughout the study (Dalkey).

The instrument used for the Delphi study consisted of a three-round, Web-based questionnaire. The initial questionnaire was created by the researcher and committee members containing the open-ended objective. Statements acquired in Round One were analyzed and categorized into eight technical themes by three independent coders (Montgomery & Crittenden, 1977).

Panelists were asked to rate technical statements using a four-point summated-rating scale in Round Two. Based on panel members responses, statements receiving a mean rating of 3.00 or higher were considered by the researcher to have reached consensus from the expert panel. Per Round Two, 27 technical statements reached consensus from panelist. Further, statements that received a mean rating of less than 3.00 were resubmitted to panel members via Round Three for additional assessment. In Round Three, panelists were asked to "agree" or "disagree" with the statement. If they did not agree with the statement, they were encouraged to re-write the statement so that they would agree. Of the 21 statements re-submitted to panelist in Round Three, 20 statements were agreed to by two-thirds of the panelists, thus reaching consensus.

Findings

This study's objective was to identify technical competencies deemed necessary for students' entry-level employment in the animal science industry following high school graduation. After the initial distribution of the Round One questionnaire, 133 statements were collected from the 32 respondents. This procedure produced 48 technical competency statements for Round Two. The statements were organized into eight thematic categories: Animal Handling/Husbandry (5 competencies); Animal Selection and Evaluation (4 competencies); Business, Marketing and Data Management (11 competencies); Health and Nutrition (10 competencies); Operation and Maintenance of Tools and Machinery (5 competencies); Policies and Food Safety (4 competencies); Production Agriculture (3 competencies); and Reproduction and Genetics (7 competencies).

Based on panel members' responses, 27 of the 48 statements reached consensus of agreement by receiving a mean rating score of 3.00 or higher (Table 1) during Round Two. Of those, seven (25.9%) statements were from Business, Marketing and Data Management; six (22.2%) statements from Health and Nutrition; four (14.8%) statements came from Operation and Maintenance of Tools and Machinery; four (14.8%) statements from Reproduction and Genetics; three (11.1%) statements came from Animal Handling/Animal Husbandry; two (7.4%) statements from Policies and Food Safety; one (3.7%) statement came from Animal Selection and Evaluation; and one (3.7%) statement from Production Agriculture. The remaining 21 statements not reaching consensus (i.e., $M = 2.99$ or less) were sent back to panel members in Round Three of the study.

The three statements on which participants strongly agreed high school graduates of the animal systems should possess were "use basic math skills" ($M = 3.54$; $SD = 0.51$), "execute general farm safety practices" ($M = 3.54$; $SD = 0.65$), and "understand animal needs" ($M = 3.54$; $SD = 0.65$) (Table 1). Additionally, participants reached agreement ($M = \geq 3.00$) on 24 statements ranging from "identify unhealthy animals" ($M = 3.46$; $SD = 0.58$) to "operate Microsoft Office" ($M = 3.04$; $SD = 0.87$) (Table 1).

The bottom five statements on which participants agreed least were "perform general welding practices" ($M = 2.69$; $SD = 0.68$), "understand commodity markets" ($M = 2.69$; $SD = 0.68$), "understand general agricultural politics" ($M = 2.62$; $SD = 0.57$), "interpret expected

progeny differences" (*M* = 2.62; *SD* = 0.90), and "evaluate and comprehend carcass data" (*M* = 2.50; *SD* = 0.86).

Table 1

Agreement Levels for Entry-level Technical Skills Needed in the Animal Science Sector According to Animal Science Experts per Round Two of the Delphi Procedure (*N* = 26)

	Statement	Topic Theme[a]	*M*	*SD*	% Agreement (marked 3 or 4)[b]
1.	Use basic math skills	BMDM	3.54	.51	100.00
2.	Execute general farm safety practices	OMTM	3.54	0.65	92.30
3.	Understand animal needs	AH/H	3.54	0.65	92.30
4.	Identify unhealthy animals	H&N	3.46	0.58	96.15
5.	Operate farm equipment in a safe manner	OMTM	3.42	0.64	92.30
6.	Value general animal health	H&N	3.35	0.63	92.30

Table 1 (continued).

	Statement	Topic Theme[a]	*M*	*SD*	% Agreement (marked 3 or 4)[b]
7.	Read and interpret equipment operating procedures	OMTM	3.27	0.53	96.15
8.	Understand male and female anatomy of specific livestock/equine	ASE	3.27	0.67	88.46
9.	Record and maintain relevant data	BMDM	3.23	0.65	88.46
10.	Understand basic animal reproduction	R&G	3.19	0.63	88.46
11.	Use basic accounting skills	BMDM	3.19	0.69	84.61
12.	Monitor an unhealthy animal	H&N	3.15	0.61	88.46
13.	Understand strengths and weaknesses of artificial insemination versus	R&G	3.12	0.65	84.61

	natural service breeding programs				
14.	Follow basic business policies, laws, and legalities	BMDM	3.12	0.86	92.00
15.	Understand livestock/equine 'point of balance' and behaviors when handling	AH/H	3.08	0.63	84.61
16.	Transport livestock/equine	AH/H	3.08	0.63	84.61
17.	Create career development documents	BMDM	3.08	0.69	80.76
18.	Understand livestock/equine nutrition	H&N	3.08	0.69	80.76
19.	Understand proper use of antibiotics, vaccinations, other medical remedies	H&N	3.08	0.74	76.92
20.	Identify prevalent agricultural policies at the state and national level	P&FS	3.08	0.74	53.84
21.	Administer antibiotics and vaccinations	H&N	3.07	0.74	76.92

Table 1 (continued).

	Statement	Topic Theme[a]	*M*	*SD*	% Agreement (marked 3 or 4)[b]
22.	Understand selected aspects of production agriculture	PA	3.04	0.53	88.46
23.	Understand available markets for specific livestock segments	BMDM	3.04	0.66	80.76
24.	Create and send emails	BMDM	3.04	0.72	76.92
25.	Understand bio-security threats in the agriculture industry	P&FS	3.04	0.77	80.76
26.	Recognize gestation periods for various livestock/equine	R&G	3.04	0.77	73.07
27.	Operate Microsoft Office	BMDM	3.04	0.87	84.00
28.	Use basic mechanical tools	OMTM	2.99	0.49	88.46

29.	Prevent bio-security risks	P&FS	2.99	0.75	80.76
30.	Feed livestock	H&N	2.96	0.66	84.61
31.	Brand/tag livestock/equine in a safe manner	AH/H	2.92	0.63	76.92
32.	Demonstrate work experience in the livestock industry	PA	2.88	0.59	76.92
33.	Describe significant livestock/equine breeds and their relation to industry	ASE	2.88	0.77	65.38
34.	Recognize nutritional needs pre/post breeding	H&N	2.88	0.86	65.38
35.	Evaluate livestock/equine based on composition	ASE	2.85	0.67	69.23
36.	Understand basic elements of plant and soil sciences	PA	2.81	0.63	69.23

Table 1 (continued).

	Statement	Topic Theme[a]	*M*	*SD*	% Agreement (marked 3 or 4)[b]
37.	Identify the strengths and weaknesses of individual pedigrees	R&G	2.81	0.63	69.23
38.	Break/train livestock/equine	AH/H	2.81	0.63	65.38
39.	Identify causes of animal illnesses/diseases and parasites	H&N	2.81	0.75	61.53
40.	Understand the estrus cycles of various species	R&G	2.81	0.94	68.00
41.	Understand various feed intakes	H&N	2.77	0.71	69.23
42.	Perform basic marketing skills	BMDM	2.77	0.82	53.84
43.	Perform a cost/benefit analysis to determine potential costs, profit, and	BMDM	2.77	1.03	56.00

	losses				
44.	Perform general welding practices	OMTM	2.69	0.68	65.38
45.	Understand general agricultural politics	P&FS	2.62	0.57	57.69
46.	Understand commodity markets	BMDM	2.62	0.70	57.69
47.	Interpret expected progeny differences	R&G	2.62	0.90	56.00
48.	Evaluate and comprehend carcass data	ASE	2.50	0.86	42.30

Note. [a]BMDM = Business, Marketing, and Data Management; P&FS = Policies and Food Safety; OMTM = Operation and Maintenance of Tools and Machinery; H&N = Health and Nutrition; R&G = Reproduction and Genetics; PA = Production Agriculture; AH/H = Animal Handling/Husbandry: ASE = Animal Selection and Evaluation
[b]Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Agree

Conclusions

This Delphi study sought to identify the technical competencies deemed necessary for entry-level employment of high school graduates in the animal science industry on their successful completion of coursework in the animal systems career pathway. Round One data yielded 133 technical statements. These responses were collapsed (i.e., removal of duplicate statements) into 48 technical statements for the expert panel members to rate during Round Two of the study. Of these, 21 statements reached consensus of agreement in Round Two. The 21 remaining statements were re-submitted to the panelists per Round Three, by which 20 reached consensus. The lone statement that did not reach consensus came from the theme of Policies and Food Safety. However, because panelists ranked all 48 statements in Round Two within the "real limits" of "agreement" ($M = 2.5 – 3.49$), it was concluded that these statements should be included in the curriculum designed for the animal systems pathway component of secondary agricultural education in Oklahoma.

Specifically, the theme areas "Business, Marketing, and Data Management" and "Health and Nutrition" represented the largest number of accepted statements. Notably, panelists "strongly agreed" that entry-level employees should be able to "use basic math," "practice farm safety," and "understand animal needs" to be employable in the animal science industry.

Recommendations for Practice

It is recommended that secondary agricultural education instructors seek out opportunities to integrate basic math into their existing animal science lessons per the animal

systems pathway. Professional development and in-service workshops should focus on helping agricultural education instructors recognize where math naturally exists within the animal systems pathway and determine ways in which it can be emphasized in animal science lessons. Specifically, instructors should be exposed to models and methods which would enable them to integrate math through the context of agriculture (Parr, Edwards, & Leising, 2006).

Additionally, secondary agricultural education instructors should emphasize general farm safety in animal systems pathways courses. Typically, "safety" is a unit predominantly taught in secondary agricultural power and technology courses. Because it was an important finding in this study, secondary agricultural education instructors should seek ways to highlight safety in secondary animal science courses. Again, professional development and in-service training seminars should exist to help instructors emphasize, or in some cases include a complete unit of instruction on general farm safety, as it relates to handling livestock and operating machinery in the animal science industry.

Recommendations for Future Research

It is recommended that this study be replicated in other states. It is possible that important entry-level skills identified in this study would be similar to other states. However, because of cultural and ethnical differences, geographic location, and variation in the agricultural industry, future studies could produce different technical skills preferred by employers in their respective states. If so, then adjustments would need to be made to meet the needs of employers to ensure that high school graduates of agricultural education receive appropriate instruction to prepare them for future employment in the animal agriculture industry.

Further, the views and opinions of students and agricultural education instructors should be described in future studies. Although employers' needs have been examined, it is important to remember that students are the primary and foremost clientele that secondary agricultural education serves. The building of their human capital (Shultz, 1961) is dependent on the skills and knowledge gained in secondary education, which is presented to them by their instructors. Students' perceptions coupled with investigating agricultural education instructors' viewpoints and triangulating their responses with this study's findings could further improve the appropriateness of the animal systems pathway curriculum.

Additionally, the findings of this study should be cross-walked with the current Oklahoma secondary animal systems career pathway. If the study's findings are not substantially congruent with the current curriculum taught in the animal systems career pathway, i.e., deficiencies exist, curriculum revisions should be made to ensure the 27 technical competencies, on which industry experts agreed, are evident. If modifications to existing animal systems curriculum are forthcoming, then, it is recommended that additional research be conducted to examine the impact the changes made to the curriculum had on entry-level graduates' employability.

The Agricultural, Food and Natural Resources career cluster in Oklahoma provides students the opportunity to complete competency examinations upon their completion of a pathway. Therefore, it is recommended that the statements agreed to by the Delphi panelists be

compared to competency examination test items in the animal systems career pathway. These comparisons would provide further insight in determining if animal systems curriculum, testing materials, and industry demands are aligned.

Finally, while this study sought to determine the skills high school graduates should possess on entrance into the animal science sector, it is recommended that future studies in other areas of the secondary agricultural education curriculum be pursued. For instance, what skills are deemed necessary for employment in the remaining six pathways, e.g., Agricultural Communications pathway, Agribusiness and Management pathway, as perceived by employers?

Implications and Discussion

Currently, secondary agricultural education is divided into curriculum areas based on the Agricultural, Food and Natural Resources Career Cluster and represented by seven pathways. As outlined by Oklahoma Agricultural Education (2008), clustering similar occupations, such as animal systems, with outlined curriculum may enable students to learn competencies better that are necessary for success in college as well as the workplace. This approach is congruent with Roberts' and Ball's (2009) philosophical assertions about agriculture as a *context* and *content* domain for student learning. Further, this implication is supported by the theoretical framework posited by Human Capital Theory. As stated by Shultz, among the five best ways to improve human capital are "formally organized education at the elementary, secondary and higher levels . . ." (p. 9) and to provide humans with opportunities to acquire skills needed in the labor force.

Similarly, it could be assumed that competencies acquired in the animal systems pathway not only enhance students' probability of entry-level employment in related industry, but also provide a vehicle for the integration of core academics, such as mathematics and science. This implication is supported by Balschweid and Huerta (2008) who concluded "teaching advanced life science within the context of animal agriculture can enhance students' immediate marketability in the work place and provide students a launching pad for post-secondary educational pursuits" (p. 18).

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An Assessment of the Animal Science Technical Skills Secondary Agricultural Education Graduates Need for Employment in the Animal Science Industry: A Delphi Study

Discussant Remarks- Jacquelyn Deeds, Ph.D. Mississippi State University

Wendy Lee Slusher, Prague High School, Jeremy Shane Robinson, and Michael Craig Edwards, Oklahoma State University

It is important in a technical field such as agriculture to keep teachers current on industry standards and expectations. This study uses human capital theory to develop a conceptual model with skilled workers as the outcome. The authors are to be commended for making good use of theory to advise practice.

The study correctly used the Delphi technique to determine the technical skills needed to take beginning position in the animal science industry. The panel of experts asked to participate was well defined and appropriate for the study.

The findings related to math skills as a most important knowledge was very interesting and should give additional strength to the inclusion of math skills in the curriculum. I found it interesting that only one of the beginning statements related to animal selection and evaluation reached consensus.

The conclusions were hard to find in the paper and I wishthe recommendations for practice would have been stronger and more specific. I hope the authors have taken the next step to compare the findings to the state approved curriculum.

Some questions for discussion would include:

When was the study done and would the theoretical frame work be different in the 2009-2010 economy?

How do the findings fit with the industry validated standards in The National Council's proposed national curriculum standards?

Who has been informed of these findings and what is planned to encourage the use of the findings?

Variable Relationships Affecting Agriscience Teachers' Stages of Concern for Content Area Reading Strategies

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In spite of national initiatives such as the No Child Left Behind Act of 2001, American students continue to be struggling readers. Research on content area reading strategies (CARS) has shown that such strategies increase students; ability to read and comprehend text. The purpose of this research was to assess agricultural educators' implementation of content area reading strategies in their classroom. A tailored-design, web-based questionnaire was distributed to 371 Florida agriscience educators to complete this descriptive, census survey. The results indicated the total number of hours of CARS professional development was not related to progression through the stages of concern. This study also underscored the lack of consistency in the professional development programs these teachers completed. In order to better understand the differences of the professional development programs, research should be conducted to determine the characteristics of various CARS professional development programs. Practitioners should provide a consistent, in depth professional development program to provide ongoing training and support throughout a several year process.

Introduction

The U.S. Department of Education [USDE] has reported over eight million struggling readers in the United States between fourth and twelfth grade (2003). Additionally, for over 20 years, math achievement and SAT scores have been increasing while verbal scores have remained stable or declined slightly. (College Board, 2002; USDE, 2008). When comparing international reading proficiency, U.S. students have ranked toward the bottom, even below students from developing countries (Snow, 2002). These statistics have prompted a number of state and national reading initiatives. In an attempt to provide higher quality education to America's students, the No Child Left Behind (NCLB) Act has mandated a major change across the nation in education, with a large section of the NCLB Act focused on improving student literacy. However, in a NCLB accountability report published by the USDE highlighted continuing literacy problems (Mapping America's Educational Progress, 2008) only about 30% of fourth and eighth grade students performed at the proficient reading level, with students of low socioeconomic status and different ethnicities performing much lower. Two percent of the same students performed below basic levels. Since 2002, students have made steady improvements in math scores. However, fourth graders have improved their reading scores minimally and eighth graders' reading scores have slightly declined. The Mapping Florida's Progress 2008 report shows that Florida's students rank below the national average for reading achievement.

Park (2008), in notes from a roundtable discussion at the National Agricultural Education Inservice regarding literacy in agricultural education, emphasized the unique ability agriscience teachers possess to facilitate content area reading in students who are motivated to learn the

content. If agriscience teachers purposefully introduce reading strategies into instruction, these teachers have the ability to increase student reading motivation and comprehension. These experiences provide students with opportunities to learn lifelong literacy skills and engage students in the content (Park, 2008; Fisher & Ivey, 2005). However, historically, agriscience teachers have been the most resistant to Content Area Reading Strategies [CARS]. O'Brien and Stewart (1990) found that of the pre-service content area teachers included in their study, agricultural educators were the most opposed to classroom reading implementation. Eighty-five percent of the pre-service agricultural educators rejected content area reading (O'Brien & Stewart). More recently, Park and Osborne (2006a) identified teachers' lack of knowledge and confidence in CARS implementation as the main obstacles to incorporating reading into agricultural education programs with agriscience teachers unable identify specific CARS to implement in their curricula (Park and Osborn, 2006b).

Successful implementation and continuation of CARS instruction relies on prolonged professional development and support for teachers (Vacca, 2002a; Vacca 2002b). A school-wide effort for CARS professional development relying on proper organization, leadership, scheduling, and development has been needed (Meltzer, 2001). Meltzer noted the need for continuing cycles of "(1) examining the outcomes, (2), reviewing and improving program components, (3) seeking practical feedback, and (4) implementing improvements" to ensure successful professional development support for CARS (p.7).

Educators, politicians, and parents have been investigating how to improve student performance in all areas of education, especially literacy. School systems have invested time and money in teacher CARS professional development. Park and Osborne (2006b) stated the need to research the effectiveness of CARS professional development programs and the utilization of CARS in agriscience. An objective evaluation of the success of teacher professional development programs in content area reading in agriscience is needed to validate the continuation of these programs. In order to evaluate the success of an innovation, documentation of implementation must be achieved (Hall & Hord, 2006). Have teachers who have completed CARS professional development programs implemented CARS into the classrooms? The problem under investigation in this study was, what factors have influenced agriscience teachers' implementation of CARS instruction?

Literature Review/Theoretical Framework

The Concerns-Based Adoption Model [CBAM] (Hall & Hord, 2006) (Figure 1) was chosen as the theoretical base of this study for three reasons: 1) it has been based on 35 years of research focused on educational change, 2) it has been extended and tested in different settings, and 3) it is recognized as one of the strongest models for educational change (Hall & Hord; Anderson, 1997). The research-based model was designed to facilitate change and provide diagnostic method to measuring implementation of an innovation (Hall & Hord). The model consists of the environment, the user system culture, resource system, change facilitator team, interventions, users and nonusers, and three diagnostic measures: stages of concern, levels of use, and innovation configurations (Hall & Hord).

Stages of Concern [SoC] are a diagnostic component which addresses the affective side of change (Hall & Hord, 2006). The feelings and perceptions of participants are known as

concerns. The SoC were developed based upon research on the evolution of concerns throughout the change process and depict a progression of concerns through which people move during the implementation process. Knowing teachers' concerns can help judge implementation of change or can be used to develop focused workshops, provide individual coaching, and create strategic plans to more effectively facilitate change.

Based upon a thorough literature review, the researcher identified the conceptual framework variables and created a conceptual model pictured in Figure 1. The conceptual model depicts the internal and external variables related to agriscience teachers concerns regarding the implementation of content area reading strategies.

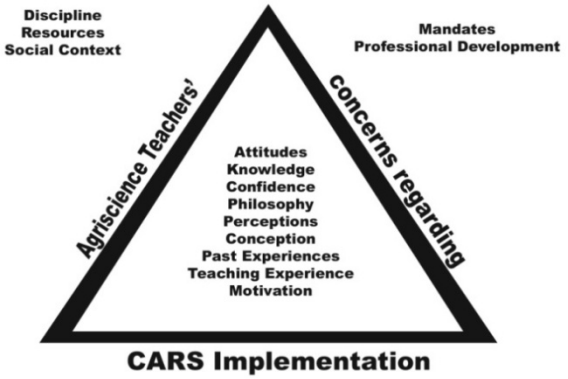

Figure 1. Conceptual model

The researcher identified teacher attitudes, confidence, knowledge and experience, motivation, perceptions and conceptions, and teaching philosophy as internal variables for CARS implementation. Park and Osborne (2006a) studied agriscience teacher's attitudes concerning CARS and identified motivation, pressures, and barriers related to CARS implementation. Teachers were motivated to use CARS so students could establish background information. Pressures included the diversity of students and their reading abilities and the documentation of reading for administrators. Park and Osborne's findings identified that although teachers had a fundamental knowledge of CARS, several barriers concerning teachers' knowledge and confidence existed. However, the researchers found that positive teacher attitudes could also be passed to the students.

Teacher confidence and comfort with the innovation played a substantial role in implementation of information and communication technologies (Granger, Morbey, Lotherington, Owston, & Wideman, 2002) Park (2005) acknowledged a lack of confidence in agriscience teachers' ability to use CARS and highlighted their lack of practice with CARS as a cause. Park and Osborne (2006a) identified a lack of confidence in utilization and lack of knowledge on the proper use of CARS as major implementation barriers.

In exploring agricultural educators' motivation to utilize CARS, Park and Osborne (2006a) found that no teachers "consciously implemented reading or CARS" (p. 43). They utilized reading assignments and corresponding questions as a way to establish baseline information or for substitute plans. Some of the participants did understand the importance of

CARS. However, when participants knew they were in a study, teachers in a comparison group of a CARS study implemented twice the strategies as teachers in the treatment group (Park 2005). Park (2005) concluded "with proper motivation, agriscience teachers may be willing to alter their preferred teaching methods and adopt new CARS."

Content teachers, including agriscience teachers, realized the importance of teaching specific comprehension skills for the content area (Bryant, Ugel, Thompson, Hamff, & Hougen, 2001; Park & Osborne, 2006b). Agriscience teachers believed reading was important for learning in agriscience, yet many teachers fail to assign individual texts to students which may "hinder reading development" (Park & Osborne, 2006b, p. 11). Park and Osborne recommend using trade journals and electronic texts in the agriscience classroom. They also suggested teachers focus more efforts on activities during the pre- and during-reading periods, model reading, and incorporate CARS into classroom instruction.

From the literature, the researcher identified discipline, mandates, professional development, and social context as external variables for CARS implementation. Aneke and Finch (1997) found no significant difference when comparing SoC based on vocational and academic teaching areas; however, they did not make comparisons within specific disciplines. Conversely, Bean (1997) found that preservice teachers' judgment of what CARS worked well for the discipline was a factor when selecting CARS. Moje (1996) found that students did not transfer CARS to other classrooms. She supported teaching domain specific content literacy methods in each discipline, so students develop social practices and knowledge necessary to apply them to that specific domain.

Park and Osborne (2005) found that agriscience teachers wanted additional professional development in CARS which addressed "where, how and why to use CARS in their agriscience courses" (p. 138-139). The teachers understood they needed further professional development and time to effectively incorporate CARS. Park suggested providing an opportunity for teachers to practice using and teaching the strategies during professional development.

Purpose and Objectives

The purpose of this research was to assess agricultural educators' implementation of content area reading strategies [CARS] in their classrooms. In order to meet the purpose of this study, the following objectives were investigated:

1. Determine the relationship between CARS professional development and the Stages of Concern of agriscience teachers.
2. Determine the relationship between CARS conceptual variables and agriscience teachers' primary Stage of Concern.

Methodology

A descriptive census survey design was used in this study. The researcher used a web-based questionnaire to collect the Stages of Concern and contributing variables of Florida agriscience teachers towards the implementation of content area reading strategies (CARS).The population for this study was Florida agriscience teachers. The researcher obtained a list of current Florida agriscience teachers ($N = 371$) from the 2008 Florida Agricultural Education

Directory which served as the population frame (Myers & Warner, 2008). The 2008 Florida Agricultural Education Directory was chosen as the population frame because it functioned as the only updated, comprehensive list of Florida agriscience teachers in the state. Two hundred fourteen questionnaires were completed for an overall response rate of 57.7% (n = 214).

The researcher utilized the Stages of Concern Questionnaire (SoCQ) developed by George, Hall, and Stiegelbauer (2006). This questionnaire was composed of 35 Likert-type questions that assessed the concerns of the individuals involved in the educational innovation change process – the integration of Content Area Reading Strategies (CARS). This questionnaire allowed respondents to indicate the relevance and intensity of their concerns towards CARS. In addition to the Likert questions, a free-response question allowed participants to express their concerns in their own words, as recommended by Hall and Hord (2006) and G. Hall, personal communication (2008).

In addition to the SoCQ, the researcher included several questions to determine the CARS professional development history of the teachers. Teachers were asked to indicate whether they had completed different levels of training, give the numbers of hours spent in each type of training, and provide a brief description of the training. Lastly, demographic questions were included to better understand the population and to assess the conceptual variable identified.

Upon IRB approval, the researcher proceeded with the survey using Dillman's (2007) Tailored Design Model for survey collection. In order to analyze the data from this study, the researcher used Statistical Package for the Social Sciences (SPSS) 17.0 for Windows. Descriptive statistics, including frequencies and central tendencies, and correlational statistics were used to analyze the concerns of agriscience teachers towards CARS. Additionally, the Microsoft Excel SOCQ-075 Graph and Print program was used to create an overall concerns profile for the group (Scott & Persichitte, 2006).

Dillman (2007) recommended addressing nonresponse error in all survey-based research studies because the potential for this type of error exists in all survey research. Since it would be challenging to address the Stage of Concern variable in a brief phone survey with nonrespondents, concern profiles were created for early respondents and late respondents. Ary, Jacobs, Razavieh, and Sorensen, (2006) stated that research has shown that similarities usually exist between late respondents and nonrespondents. Pace (1939) found that nonrespondents and respondents are similar. These similarities allow for researchers to estimate the responses of nonrespondents based upon late respondents. Thus, early and late respondents were compared to address nonresponse error. Early respondents (n = 66) were defined as the participants who responded to the cover letter with the first link to the survey, before the reminder e-mail was sent. Late respondents (n = 42) were defined as participants who responded after the final contact was made. Both of the profiles were non-user profiles. The early responders had higher intensity concerns than the late responders across all stages.

Findings

Of the respondents, 55.6% (n = 85) were male and 44.4% (n = 68) were female. The age range with the greatest number of participants was 51-60 with 29.4 % (Table 1). The age range with the least amount of participants was >60 with 5.9%.

Table 1. Ages of participants (n = 153)

Age Range	*f*	%
51-60	45	29.4
21-30	38	24.8
41-50	33	21.6
31-40	28	18.3
> 60	9	5.9

Note. *f*=frequency.

Teachers reported their number of years teaching to be between 0 and 40 with a mean of 15.17 years. When teachers were asked if they have taught any subjects in addition to agriculture, 53.2% (n = 82) responded yes, while 46.8% (n = 72) responded no. Participants were asked how long they have been involved with content area reading strategies, not counting this year. Of the responses, 48.4% (n = 74) responded they had never been involved with the innovation and 15.7% (n = 24) responded they have been involved for five or more years.

When asked at which level of expertise the participant considered himself/herself to be, over 60% of the participants considered themselves to be non-users or novice users. Almost 40% considered themselves intermediate users or old hands. None of the respondents considered themselves to be a past user of the innovation (Table 2).

Table 2. Teachers perceptions of their expertise with CARS (n = 153)

Perception	*f*	%
Non-user	51	33.3
Novice	45	29.4
Intermediate	43	28.1
Old hand	14	9.2
Past user	0	0.0

Note. f=frequency.

Participants were asked how often they have been incorporating CARS into their lesson. Respondents indicated 16.3% (n = 24) incorporated CARS 3-4 times a week. A third of the respondents (n = 49) reported incorporating CARS< 1 per month. Concern profiles were developed based on teachers' frequency of use of CARS (Figure 2). Each of these profiles were *nonuser* profiles with a slight *negative one-two spilt*. The *negative one-two split* occurs when personal concerns are higher than informational concerns. This indicated that teachers were more concerned about how the use of CARS would affect their position and job security than they were about learning more about the concern. Teachers with a *negative one-two spilt* may demonstrate resistance to the change. Their personal concerns need to be addressed for them to continue to progress through implementation. Weekly and monthly users had slightly higher intensity concerns than seldom and nonusers.

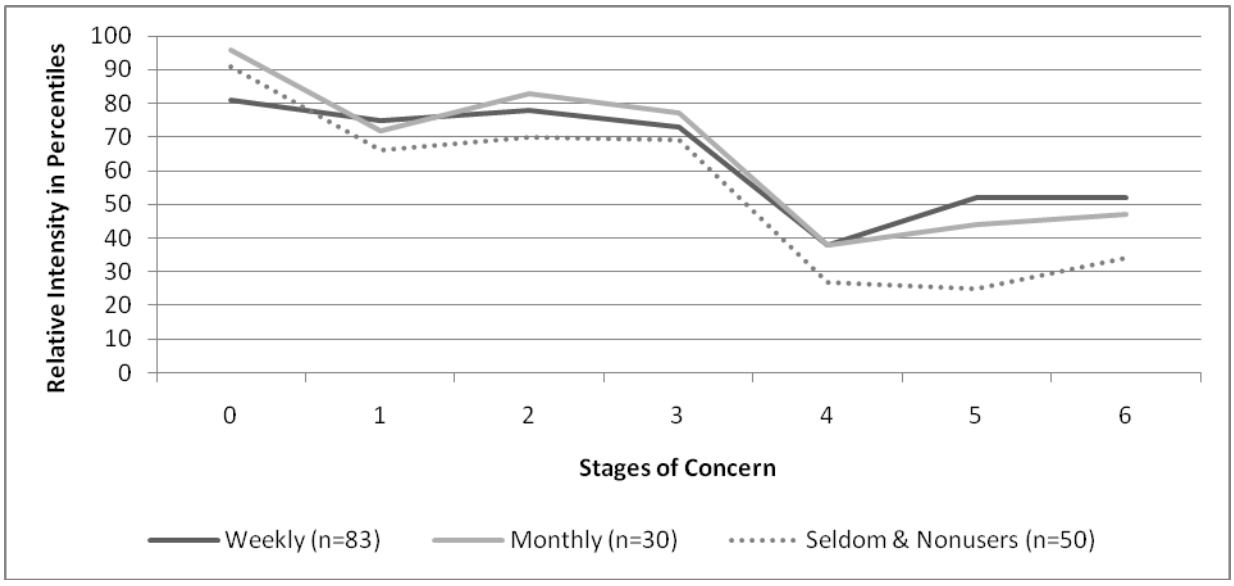

Figure 2. Concerns profile for teachers based on frequency of use

The major difference in these three profiles, was the direction of the tail of the graph at Stage 6. The weekly users score for Stage 6 was the same as their score for Stage 5, thus the profile neither tailed up or down. Monthly users had only a slight *tailing-up* of three points, which indicated that they have other ideas which may be competing with the innovation, but these ideas have not caused much resistance to the innovation. Seldom and nonusers have a *tailing-up* of 9 points. This indicated a resistance to the implementaiton of CARS.

Participants were asked to rate their working relationship with the reading coach from their school. One-third of respondents indicated they had a weak or very weak relationship with the reading coach. Only about 26% (n = 39) of respondents considered their relationship to be strong or very strong, but two-thirds rated their relationship average or higher.

Participants were asked if they have been currently involved in the first or second year of another major innovation or program. In response to this question, 55.6% (n = 85) of the respondents indicated they were involved in the first or second year of another major innovation and 44.4% (n = 68) of the respondents indicated they were not involved in the first or second year of another major innovation. These innovations focused on incorporating reading, science, math, technology, active learning strategies, and differentiated instruction in the classroom.

The teachers were asked what they believed to be the biggest barriers to CARS implementation in their school (Table 3). Of the respondents, 5.4% (n = 6) were unsure what barriers existed. The number one barrier identified by the respondents was time (33.9%; n = 38).

Table 3. Teacher perceived barriers to school-wide CARS implementation (n = 92)

Barrier	*f*	%
Time	38	41.3
None	15	16.3
Other demands	10	10.9
Training needs	8	8.7
Unsure	6	6.5
Planning and preparation	5	5.4
Materials/resources	4	4.3
Student interest and motivation	4	4.3

Note. f=frequency. % = > 100 due to teachers identifying multiple barriers.

Stages of Concern Profiles were developed based on the number of professional development hours completed (Figures 3-5). Overall, a general pattern did not emerge from the profiles based on the amount of professional development they received. Each profile was characterized by a high relative intensity (88-99) in Stage 0, Awareness, with the exception of teachers with 81-90 hours of professional development. Of the 14 profiles developed, between 1 and >130 hours of professional development, 9 of them *tail-up*. The *tailing-up* indicates that teachers have other ideas which compete with the innovation. From the 9 profiles which *tail-up*, 6 of them increase more than 10 percentile points. Some of the profiles identified strong peaks, such as those with 61-70 hours of research in management and those with > 130 hours in collaboration. All profiles for all levels of professional development were classified *nonuser profiles*.

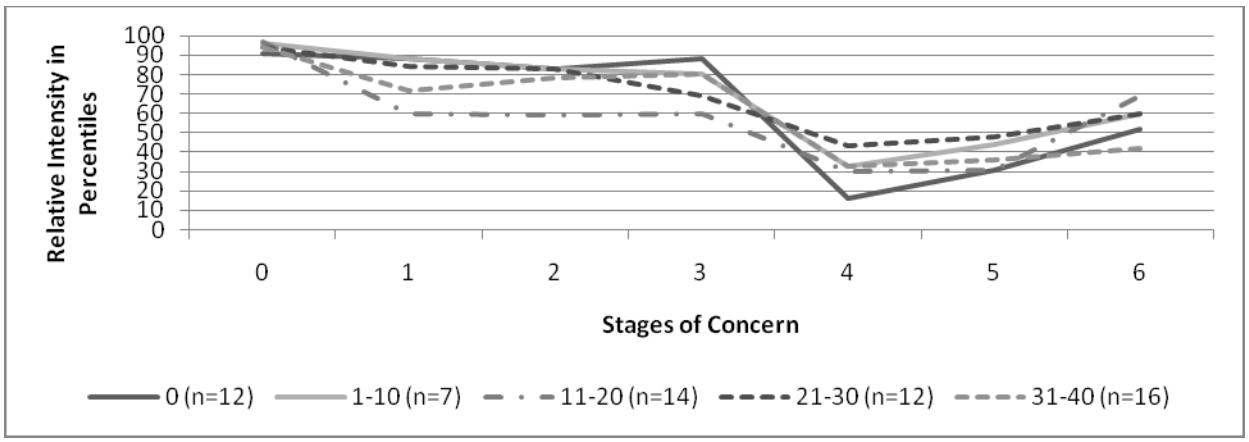

Figure 3. Group concerns profiles for teachers with 0-40 hours of CARS professional development.

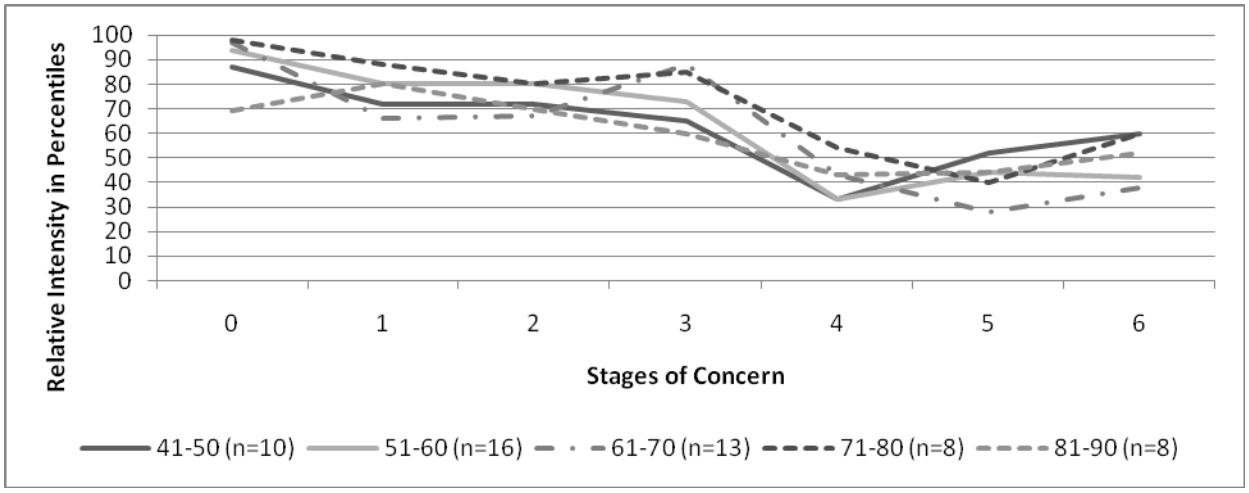

Figure 4. Group concerns profile for teachers with 41-90 hours of CARS professional development

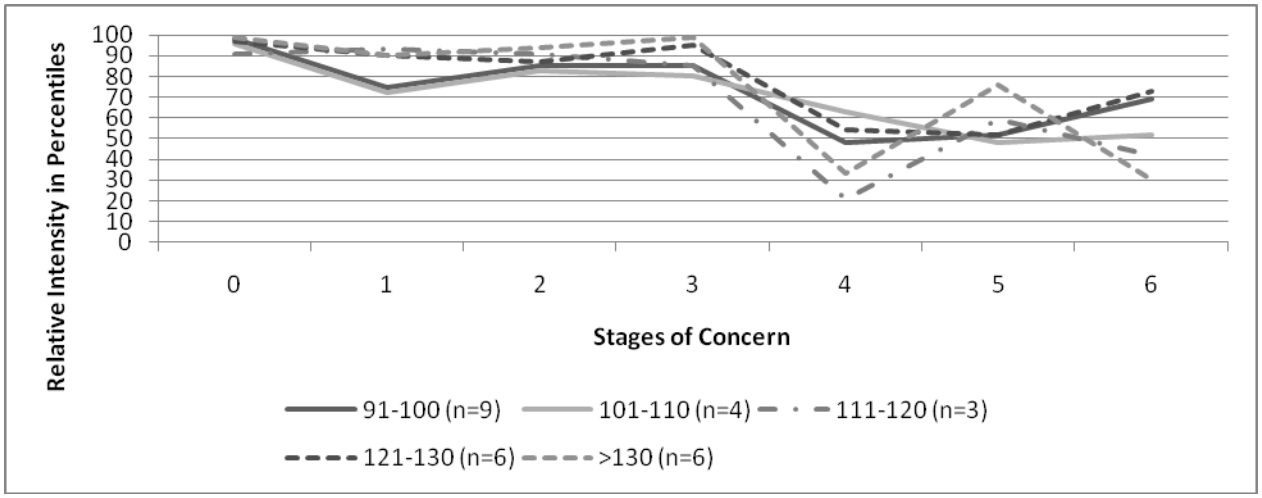

Figure 5. Concerns profile for teachers with 91->130 hours of CARS professional development.

George, Hall, and Stiegelbauer (2006) suggested analyzing the primary Stage of Concern of participants. Frequencies were run on the primary Stage of Concern. Frequencies were calculated on the primary Stage of Concern for participants (Table 4). The majority of participants' (51.3%, $n = 96$) primary Stage of Concern was in the awareness stage, Stage 0.

Table 4. Primary Stage of Concern frequencies ($n = 187$)

Primary Stage of Concern	*f*	%
Stage 0 – Awareness	96	51.3
Stage 2 – Personal	29	15.5
Stage 3 – Management	28	15.0
Stage 1 – Informational	23	12.3
Stage 5 – Collaboration	7	3.7
Stage 6 – Refocusing	4	1.9
Stage 4 – Consequences	0	0.0

Note. f = frequency.

Correlations were calculated to determine the magnitude and direction of the relationship between demographic variables and the primary Stage of Concern. Correlations between variables with ordinal data were calculated using Spearman's rho (Table 5). All of the correlations were determined to be positive with the exception of frequency of incorporating CARS, past teaching experiences, and current involvement in other innovations which were determined to be negative correlations.

Teachers perceived level of expertise had a moderate correlation coefficient above 0.30. Frequency of incorporating CARS and relationship with the reading coach had low correlation coefficients between 0.10 and 0.29. Current involvement in other innovations, number of years teaching, and gender had negligible correlation coefficients between 0.01 and 0.09.

As the perceived level of expertise, relationship with the reading coach, age of the participant, and number of years teaching increase, the primary Stage of Concern tended to increase. The primary Stage of Concern decreased as the frequency of incorporating CARS tended to increase. Dummy codes were used to code nominal data. Teachers were asked if they had taught subjects other than agriculture, those who responded yes (1), were more likely to have a higher primary Stage of Concern for CARS than those who replied no (2). Teachers who were currently involved in other in the first or second year of another major innovation (1) tended to have a lower primary Stage of Concern than those who were not involved in the first or second year of another innovation (2). Males (1) tended to have a higher primary Stage of Concern than females (2).

Table 5. Spearman's rho correlation coefficient between demographic variables and primary Stage of Concern

Demographic	n	r
Perceived level of expertise	153	.30
Frequency of incorporating CARS	147	-.29
Length of involvement with CARS	153	.26
Relationship with reading coach	144	.20
Age	153	.18

Past teaching experiences	154	-.14
Current involvement in other innovations	148	-.09
Number of years teaching	152	.09
Gender	153	.07

Conclusions & Recommendations

Gender of the participants, other teaching experiences, nor certification area had a strong relationship to their primary Stage of Concern. This study concurred with Aneke and Finch's (1997) conclusion that years of teaching experience did not affect teachers' SoC. This conclusion indicates teachers with different areas of certification and various levels of teaching experience can successfully implement CARS. Researchers should further

A positive correlation of r = .17 existed between age and primary Stage of Concern. An interpretation of this correlation would be the older the teacher, the higher his/her primary Stage of Concern. However, according to Davis (1971) a correlation of .17 is low magnitude. Age only explains 2.89% of the variance in primary Stage of Concern. Based upon the most populated age group (51-60) researchers should consider if they are less motivated to implement change because they can soon retire or if they are more likely to have more experience in the classroom and may be able to focus on the innovation better than younger colleagues. Also, teachers hired to replace retiring teachers may have very different Stages of Concern than the current teachers. Teachers approaching retirement may be able to provide valuable experience and wisdom in integrating CARS into the curriculum. They should be encouraged to collaborate with teachers unsure about integrating CARS. Research should be conducted to determine the effect of such collaborations.

Length of involvement with the innovation and participants' primary Stage of Concern had a low magnitude correlation (r = .26) indicating, as teachers have more experience with the innovation, their concerns had a slight tendency to progress to higher stages. These findings reinforce the 3-5 year time frame Hall and Hord (2006) identified for an innovation to be implemented at a high level and the first change principle "Change is a process, not an event" (p. 4). However, the correlation only explains 6.86% of the variance. Additionally the finding corroborated Aneke and Finch's (1997) conclusion that teachers with more innovation-related experience had further progressed concerns. However, the correlation between the frequency of CARS incorporation and teachers' primary Stage of Concern contradicted Aneke and Finch's finding. This negative correlation indicated that teachers who incorporated CARS more frequently tended to have lower primary Stages of Concern.

When profiles were developed based upon weekly, monthly, and seldom/never use of CARS, no substantial differences were found, which did not support any of the literature or other findings. Although social desirability bias, when respondents answer the way they think they are supposed to answer, rather than responding with the truthful answer, may offer one explanation to this oddity (Ary et al., 2006). If teachers misreported the frequency with which they utilize CARS based on how often they are suppose to use CARS rather than reporting their actual usage, they could have biased the information collected and caused the peculiarity in the findings. More research should be completed to determine if this correlation can be supported or not.

The third of participants (n = 48) who reported a weak or very weak relationship with their reading coach may have an opportunity to progress through the Stages of Concerns by developing a stronger relationship. A low positive correlation (r = .20) was found between the working relationship with the reading coach and the primary Stage of Concern. However, only 4.04% of the variance can be contributed to this correlation. The reading coach should participate on the change facilitator team for the CARS innovation to provide their expertise and develop relationships with the teachers. Teachers with a better working relationship with the reading coach will most likely feel more comfortable to approach the reading coach for support or more confident in the information the reading coach provides them. Hall and Hord (2006) underscore the importance this interaction plays in successful implementation. Close working relationships between agriscience teachers and reading coaches should be nourished and researchers should investigate the effects of these relationships to CARS implementation.

Even though the current level of involvement with other innovations can only account for 2.67% of the variance, one can assume the high number of mandates put on teachers can impede their success in implementation of innovations. The top barriers which teachers identified, time and other demands, underscore the stress that teachers have whether it is from other mandates, innovations, or paperwork. The consistently high Stage 0 concerns indicated that teachers are focused on other responsibilities. (George, Hall, & Stiegelbauer, 2006).

Teachers tend to move through the Stages of Concern as their perceived level of expertise increases. However, this self-perceived expertise only accounts for 9.12% of the variance. This conclusion supports Aneke and Finch's (1997) conclusion that teachers' concerns progressed as their experience with the innovation increased. Teachers can improve the effectiveness and efficiency of their use of CARS from their experiences. As these teachers become more effective in their use of the strategy and it becomes a natural teaching tool, they can focus more on the high level concerns and less on the lower level concerns. Building experiences through professional development programs may enable teachers to progress through the Stages of Concern faster.

The large standard deviation (SD = 52.20) and range (312) between the total number of professional development hours indicated a lack of consistency in professional development programs completed by agriscience teachers. The results have clearly indicated that the total number of CARS professional development hours is not related to progression through the Stages of Concern. These results contradict Aneke and Finch (1997) who found that Stages of Concern profiles and the intensity of the concerns changed when grouped by "hours of reform-related training" (p. 10). However, Aneke and Finch underscored the importance of these trainings to address the personal concerns of the participating teachers. This observation may indicate that it is more important to focus on the quality of the professional development and its ability to meet the needs of the teachers, rather than just the number of hours spent in professional development.

Baker, Gersten, Dimino, and Griffiths (2004) identified three key components of a professional development program which led to sustained success of an educational innovation. These components included: (1) an initial training to establish the *big picture*, (2) on-going, on-site support for the first 5 years, and (3) school investment of funds. The authors emphasized the importance of providing on-going support throughout the implementation process which

supports similar suggestions made by Hall and Hord (2006). Agriscience teachers have acknowledged that implementing this innovation will require time to adapt (Park, 2005). On-going support during this adaptation period should make the process more effective and more efficient.

Based on this study, the researcher suggests that practitioners consider the following recommendations:

1. A consistent, in depth professional development program should be implemented to provide ongoing training and support of the innovation throughout a several year process.
2. Professional development should provide an opportunity for teachers to demonstrate and practice their CARS skills.
3. Schools should utilize Stages of Concern questionnaires measure the effect of professional development on Stages of Concern and measure the success of implementation.

This study has identified the need for research in the following areas:

1. Research should be conducted to verify the calculated in this study.
2. In order to better understand the differences of the professional development programs, research should be conducted to determine the characteristics of various CARS professional development programs.
3. Research should be completed on the effectiveness of different professional development programs in order to be able design more effective and efficient programs.
4. To better meet the professional development needs of teachers, research should be conducted to identify the specific CARS professional development needs of agriscience teachers.
5. Further research should examine these variables and their relationship to the CARS innovation.

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Variable Relationships Affecting Agriscience Teachers' Stages of Concern for Content Area Reading Strategies

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Discussant Remarks- Jacquelyn Deeds, Ph.D. Mississippi State University

As part of a larger study related to CARS this paper looks more closely at teacher characteristics. The paper was well written and provided additional theoretical frame work for this part of the study.

The conceptual model was clear and informs the research presented. As a reader the use of the model helps to develop the mindset for reading the paper.

My questions related to this paper are raised by some of the demographics reported.

If 48% had never been involved with the innovation and 33% were non-users does the data adequately reflect the stages of concern of the innovation CARS?

Do you think the findings would be different if the non-users had been removed from the data analysis and would have more accurately reflected the information of interest?

The two studies related to CARS have much to tell the profession about how innovations adoption takes place with agriscience teachers.

Agriscience Teachers' Concern Profiles for Content Area Reading Strategies

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Although students today will need to rely on text more than in the past, American students are struggling to read and comprehend text. Research has supported the ability of content area reading strategies (CARS) to increase students' ability to read and comprehend text. The purpose of this research was to assess agriscience educators' implementation of CARS in their classrooms. A descriptive, census survey of 371 Florida agriscience teachers was completed using a tailored-design, web-based questionnaire. Overall, agriscience teachers' Stages of Concern profiles were non-user profiles. The researchers concluded CARS professional development programs are not meeting the needs of agriscience teachers; thus, these teachers are not progressing through the Stages of Concern and are not implementing CARS at a high level. Research should be completed to develop an Innovation Configuration which would provide a more unified vision for CARS implementation. Practitioners should develop and provide a consistent, in-depth professional development program should be implemented to provide ongoing training and support of the innovation throughout a several year process.

Introduction

Over a 20 year period, the College Board (2002) statistics showed a 23 point increase in mathematics scores on the SAT while the verbal scores remained the same. The U.S. Department of Education has reported over eight million struggling readers in the United States between fourth and twelfth grade (2003). U.S. students have ranked toward the bottom of an international comparison of reading proficiency even below students from developing countries (Snow, 2002). These statistics have prompted a number of state and national reading initiatives.

The No Child Left Behind (NCLB) Act has mandated a major change across the nation in education, and a large section of the NCLB Act has focused on improving student literacy. A statement by then U.S. Secretary of Education Paige (2001) noted the ability of this legislation to help meet the needs of America's students and to provide a quality education to all students. However, Mapping America's Educational Progress 2008, a report published by the USDE to measure the accountability of NCLB, highlighted continuing literacy problems. Only about 30% of fourth and eighth grade students performed at the proficient reading level. Those numbers decreased significantly for students of low socioeconomic status and different ethnicities. Two percent of the same students performed below basic levels. Since 2002 these students have made steady improvements in math scores. However, fourth graders have improved their reading scores minimally and eighth graders' reading scores have slightly declined. The Mapping Florida's Progress 2008 report shows that Florida's students rank below the national average for reading achievement.

Referring to The College Board's (2002) report on the ten-year trend of SAT scores, Scherer (2002) stated "educators must take a long-range view in balancing student needs as they implement the much needed national initiatives" (p.5). She noted an emphasis on mathematics and science aided in

increasing math scores; however, the narrow focus on reading limited the improvement of verbal scores. Reading programs have focused on early literacy with little attention given to reading comprehension beyond primary grades (Allington, 2002). Researchers underscored the importance reading comprehension and reading in the content area play in communication, education, employment, and citizenship (Meltzer, 2001; Vacca, 2002a). Students will need to be taught new literacy skills so they can learn how to comprehend reading materials "Reading and writing play a crucial role in the ability to 'learn for understanding'" (Meltzer, p. 1).

William S. Gray, one of the first prominent reading educators and researchers, conceptualized content area reading in the *Twenty –Fourth Yearbook of the National Society for the Study of Education, Part One* (Whipple, 1925 as cited in Vacca, 2002b). Gray believed reading was necessary in all content areas and identified content area reading instruction as a characteristic of good teaching.

The issue of adolescent literacy continues to demand attention. The Commission on Adolescent Literacy of the International Reading Association emphasizes the importance of adolescent literacy:

> Adolescents entering the adult world in the 21st century will read and write more than any other time in human history. They will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives. They will need literacy to cope with the flood of information they will find everywhere they turn. They will need literacy to feed their imaginations so they can create the world of the future. In a complex and sometimes even dangerous world, their ability to read will be crucial. Continual instruction beyond the early grades is needed (Moore, Bean, Birdyshaw, & Rycik, 1999, p. 3).

The point in school when students have been expected to use higher level thinking to extract information from text with unfamiliar structure, organization, vocabulary, and syntax has been the same time they have stopped receiving reading instruction (Allington, 2002; Meltzer, 2001Scherer, 2002; Vacca, 2002a). Although responsibility for reading instruction has fallen on English teachers in the past, students require reading instruction from other teachers as well (D'Arcangelo; Vacca, 2002a; Vava 2002b). Content teachers should help students learn how to learn in their specific disciplines by equipping them with strategies which would aid them in reading comprehension and in becoming effective learners (D'Arcangelo; Scherer, 2002).

Competent readers utilized suitable readings skills to develop a comprehension of the topic (Vacca, 2002a). Reading in the content area required students to interact with reading material before, during, and after reading (Literacy Matters, 2008). Comprehension of text also requires students to understand the literal meaning of the text, make inferences, and evaluate the material. All content area teachers could help meet the comprehension needs of students by incorporating Content Area Reading Strategies (CARS) instruction throughout all content areas (Fisher & Ivey, 2005; Literacy Matters 2002; Scherer, 2002). Teachers who equip their students with suitable reading level material and reading strategy instruction have more successful students (Allington, 2002; Literacy Matters, 2002). Fluent readers have learned to become strategic readers when their teachers have embedded reading instruction and model reading strategies into the curriculum (Bryant, Ugel, Thompson, &Hamff, 1999; Vacca, 2002a). D'Arcangelo (2002) noted CARS can be embedded easily into all content areas.

Content area teachers have often overlooked the importance of incorporating CARS into content instruction (D'Arcangelo, 2002). Early in CARS research, O'Brien and Stewart (1990) found

of the pre-service content area teachers in their study, agricultural educators were the most resistant towards implementing classroom reading; eighty-five percent of the pre-service agricultural educators rejected content area reading. Meltzer (2001) highlighted the importance of using discipline-specific CARS. Park and Osborne (2006a) noted the major obstacle to CARS implementation in agriscience was the teachers' lack of knowledge and confidence. Further, Park and Osborne (2006b) concluded that agriscience teachers cannot identify specific CARS to implement in their curricula. Continuing professional development and support for teachers has been suggested by research as being instrumental to successfully implement and sustain CARS instruction (Vacca, 2002a; Vacca 2002b).

A roundtable discussion at the National Agricultural Education Inservice emphasized the ability of agriscience teachers to capitalize on students' motivation to learn the content of agriculture courses in order to teach reading strategies which students can transfer to lifelong literacy skills (Park, 2008). Fisher and Ivey (2005) also recognized content reading as "a way to engage students in the content at hand" (p. 6).

School systems have invested substantial time and money into professional development and initiatives focused on improving student literacy. A need to determine the effectiveness of CARS professional development and level of CARS utilization in agriscience exists (Park & Osborne, 2006b). Documentation of implementation must be achieved before the success of a program can be evaluated (Hall & Hord, 2006). Have The CARS professional development programs met the needs of agriscience teachers? Are agriscience teachers incorporating CARS into their curriculum? The problem under investigation in this study was, are agriscience teachers implementing CARS into instruction in order to address the low reading performance of students?

Literature Review/Theoretical Framework

In a pre-and post-interview study, Bryant, Ugel, Thompson, Hamff, and Hougen (2001) identified the following areas of needed professional development for CARS: word identification, partner reading, collaborative strategic reading, modeling, supporting meetings, and teams. The researchers recommended developing a shared understanding of content literacy goals to guide professional development. Masten, Stacks, Priest, Scott, and Vitale (1999) found that middle school teachers who attended a three hour CARS training utilized significantly more reading comprehension strategies than teachers in the control group who attended a 3 hour behavioral principles workshop.

Aneke and Finch (1997) researched educational reform and found, "the intensity and stages of the teachers' concern profiles changed when teachers were grouped according to hours of reform-related training" (p. 10). They recommended that teachers with minimal training in an innovation be provided additional training to gain exposure to the innovation at hand. They noted, "reform-related in-service training has great potential to serve as an effective method of exposing teacher to the reform experience" (p. 11-12). The researchers noted that such training should help teachers move from lower level concerns to higher level concerns; however, these workshops must first address the personal concerns of the teachers.

Baker, Gertsen, Dimino, and Griffiths (2004) identified ongoing professional development and support as an influential variable for sustained use of an educational innovation. They identified three key components to an innovation model that led to successful implementation: 1) an initial training that developed the *big picture*, 2) use of continued, on-site support from trained graduate students for the

first five years of the innovation, and 3) investment of funds to provide logistical support for the innovation. Baker et al. made several conclusions about the success of professional development and an innovation. First, they noted the importance of using professional development to "[enhance] teaching rather than asking teachers to substitute radically new teaching methods for current ones" (p. 20). This approach eased the change process by allowing teachers to maintain autonomy in their teaching. Additionally, ongoing professional development and logistical support contributed to the success of the innovation. Finally, the professional development should develop teachers' conceptual and procedural knowledge.

The Concerns-Based Adoption Model (CBAM) (Hall & Hord, 2006) was chosen as the theoretical base of this study because it has been based on 35 years of research focused on educational change, it has been extended and tested in different settings, and it is recognized as one of the strongest models for educational change (Hall & Hord; Anderson, 1997). The Concerns-Based Adoption Model was designed to help facilitate change and provide diagnostic means of measuring implementation of an innovation (Hall & Hord). The model consists of the environment, the user system culture, resource system, change facilitator team, interventions, users and nonusers, and three diagnostic measures: stages of concern, levels of use, and innovation configurations (Hall & Hord).

Stages of Concern (SoC) is one of the diagnostic instruments of the CBAM which addresses the affective side of change (Hall & Hord, 2006). The feelings and perceptions of participants are known as concerns. The development of the SoC has been based on research of the evolution of concerns through the change process. The SoC define a progression of concerns which people move through as they implement an innovation. Focused workshops, individual coaching sessions, and strategic plans can be designed upon the SoC of participants to more effectively facilitate change.

Based on Fuller's (1969) identification of concerns, Hall and Hord (2006) have developed seven Stages of Concern. George, Hall, and Stiegelbauer (2006) offered the following definitions for each of the Stages of Concern:

> **0 Awareness:** Little concern about or involvement with the innovation is indicated.
> **1 Informational:** A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about himself/herself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner, such as general characteristics, effects, and requirements for use.
> **2 Personal:** [The] individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision-making, and consideration of potential conflicts with existing structures of personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.
> **3 Management:** Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organization, managing, scheduling, and time demands are utmost.
> **4 Consequences:** Attention focuses on impact of the innovation on clients in his or her immediate sphere of influence. The focus is on relevance of the innovation for clients, evaluation of outcome including performance and competencies, and changes needed to increase client outcomes.

5 Collaboration: The focus is on coordination and cooperation with others regarding use of the innovation.
6 Refocusing: The focus is on the exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. [The] individual has defined alternatives to the proposed or existing form of the innovation (p. 8).

Research has shown "there is a quasi-developmental path to the concerns as the change process unfolds" (Hall & Hord, 2006, p. 141). Although, they stated that neither the progression of concerns nor the direction of the progression is guaranteed. When proper conditions exist (i.e. appropriateness of change, proper involvement from leaders, and effective facilitation) participants move from Stages 1 & 2 to Stage 3 during the first couple years, and ideally they will move to Stages 4 & 5 around three to five years into implementation. Undesirable conditions can cause participants to cease progression or regress. Hall and Hord (2006) highlighted, SoC "reflect the idealized, developmental approach to change" (p. 142).

Anderson (1997) explains, "CBAM theory idealizes the Stages of Concern as a developmental progression in which teachers implementing a change have concerns of varying intensity across all seven stages at different points in the change process" (p. 334). However, teacher concern may not progress through all stages in the suggested order.

The Stages of Concern Questionnaire (SoCQ) is the most rigorous and reliable form of SoC assessment (Hall & Hord, 2006). It has been revised to address some of the concerns of the previous instrument and to reestablish its validity (G. Hall, personal communication, June 19, 2008). The assessment consists of 35 Likert type questions and is noted for being psychometrically sound and easy to take (Hall & Hord). Hall and Hord also recommend adding an open-ended concerns statement to the end of the questionnaire to ensure that all possible concerns can be expressed. From the results, SoC profiles can be developed. The strengths of the instrument include the strong reliability and validity of the instrument and the ability to develop concerns profiles. The main disadvantage of the SoCQ is participants' lack of willingness to complete it. Hall and Hord recommended this assessment for formal evaluation efforts and encouraged facilitators and evaluators to use this technique a maximum of two to three times a year.

Hall and Hord (2006) identified twelve principles of change which have emerged from CBAM research. These principles have been supported with enough evidence to be considered valid in all cases of change. The individual principles are not mutually exclusive and only cover certain aspects of change. Hall and Hord outlined the following principles of change:

1: Change is a process, not an event.
2: There are significant differences in what is entailed in development and implementation of an innovation.
3: An organization does not change until the people within it change.
4: Innovations come in different sizes.
5: Interventions are the actions and events that are key to the success of the change process.
6: There will be no change in outcomes until new practices are implemented.
7: Administrator leadership is essential to long-term change success.
8: Mandates can work.

9: The school is the primary unit for change.
10: Facilitating change is a team effort.
11: Appropriate interventions reduce resistance to change.
12: The context of the school influences the process of change (p. 4-14).

These principles must be understood to comprehend the components of CBAM (Hall & Hord).

Purpose and Objectives

The purpose of this research was to assess agricultural educators' implementation of content area reading strategies (CARS) in their classrooms. In order to meet the purpose of this study, the following objectives were investigated:

1. Ascertain agriscience teachers' CARS professional development history.
2. Determine the Stages of Concern of agriscience teachers who have completed CARS professional development program.
3. Determine the Stages of Concern of agriscience teachers who have not completed CARS professional development program.

Methodology

A descriptive census survey design was used in this study. The researcher used a web-based questionnaire to collect the concerns of Florida agriscience teachers towards the implementation of content area reading strategies (CARS). The population for this study was Florida agriscience teachers. The researcher obtained a list of current Florida agriscience teachers (*N*= 371) from the 2008 Florida Agricultural Education Directory which served as the population frame (Myers & Warner, 2008). The 2008 Florida Agricultural Education Directory was chosen as the population frame because it functioned as the only updated, comprehensive list of Florida agriscience teachers.

The researcher utilized the Stages of Concern Questionnaire (SoCQ) developed by George, Hall, and Stiegelbauer (2006). This questionnaire was composed of 35 Likert-type questions that assessed the concerns of the individuals involved in the educational innovation change process – the integration of Content Area Reading Strategies (CARS). This questionnaire allowed respondents to indicate the relevance and intensity of their concerns towards CARS. In addition to the Likert questions, a free-response question allowed participants to express their concerns in their own words, as recommended by Hall and Hord (2006) and G. Hall, personal communication (2008). In addition to the SoCQ, the researcher included several questions to determine the CARS professional development history of the teachers. Teachers were asked to indicate if they had completed different levels of training, give the numbers of hours spent in each training, and provide a brief description of the training. Lastly, demographic questions were included to better understand the population.

George, Hall, and Stiegelbauer (2006) stated that validity testing of the SoCQ has been performed by testing the relationship of the scales to one another and to variables from other concerns theories. George et al. utilized correlational matrices and factor analysis to determine "the seven scales [in the SoCQ] tapped seven independent constructs that could be identified readily with the seven

Stages of Concern proposed by the Concerns-Based Adoption Model (CBAM)" (p. 14). George et al. reported coefficients of internal reliability for each of the seven Stages of Concern which ranged between an alpha of .64 and .83, for the Stages of Concern Questionnaire. Santos (1999) stated an alpha score of .7 or greater is acceptable. George et al. also reported test-retest correlations for the SoCQ, which ranged between r = .65 and r = .86. These reported reliability scores fall within the acceptable range of reliability estimates as stated by Santos with the exception of Stage 0. Stage 0 has been under revision to help improve the reliability (Hall & Hord, 2006; George et al., 2006).

Upon IRB approval, the researcher proceeded with the survey using Dillman's (2007) Tailored Design Model for survey collection. In order to analyze the data from this study, the researcher used Statistical Package for the Social Sciences (SPSS) 17.0 for Windows. Descriptive statistics, including frequencies and central tendencies, were used to analyze the concerns of agriscience teachers towards CARS. Additionally, the Microsoft Excel SOCQ-075 Graph and Print program was used to create an overall concerns profile for the group and sub-groups (Scott & Persichitte, 2006). To address objective one, assessing the teachers' CARS professional development history, SPSS was utilized to calculate frequencies and central tendency statistics. To address objectives two and three, the researcher used the Microsoft Excel SOCQ-075 Graph and Print program to determine the concern profiles for teachers with CARS professional development training and those without training.

These findings were part of a larger study in which a total of 371 online questionnaires were sent to the population via a web link sent in an e-mail to agriscience teachers in the state of Florida. The completion of 214 questionnaires provided a response rate of 57.7% ($n = 214$). Dillman (2007) encouraged addressing nonresponse error in all survey-based research studies since the potential for nonresponse error exists in all survey research. Because it would be challenging to address the Stage of Concern variable in a brief phone survey with nonrespondents, concern profiles were created to compare early respondents and late respondents. Research has shown that similarities usually exist between late respondents and nonrespondents (Ary, Jacobs, Razavieh, & Sorensen, 2006). Pace (1939) found that nonrespondents and respondents are similar. These similarities allow for researchers to estimate the responses of nonrespondents based upon late respondents. Thus, early and late respondents were compared to address nonresponse error. Participants who responded to the cover letter with the first link to the survey, before the reminder e-mail was sent were categorized as early respondents ($n = 66$). Those who responded after the final contact was made were defined as late respondents ($n = 42$). Both of the profiles were non-user profiles; however, the early responders had higher intensity concerns than the late responders across all stages.

Post hoc reliability (Table 1) was calculated with SPSS using Cronbach's Alpha for each SoC. Santos (1999) stated an alpha score of .7 or greater is acceptable. Although the reliability scores were slightly low in Stages 0 and 1, they were similar to other studies (George et al., 2006). Stage 0 has been under revision to improve reliability (Hall & Hord, 2006; George et al., 2006).

Table 1. Post hoc reliability scores for each stage of concern ($N = 214$)

Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Alpha	.57	.67	.78	.78	.71	.78	.71

Findings

Objective 1: Ascertain agriscience teachers' CARS professional development history: Teachers were asked to indicate their participation in a range of CARS professional development experiences, which included: pre-professional, continuing education, training with reading coach, school training, county training, Florida Reading Initiative training, or other training (Table 2). The majority of teachers surveyed (75.9 %; n = 104) had participated in school training for CARS and at least half of the respondents had participated in continuing education course work, pre-professional course work, county training, and personal reading coach training regarding CARS. Only about one fourth of the respondents had participated in Florida Reading Initiative training or other CARS professional development.

Table 2. Teacher participation in CARS professional development

Training	*n*	*f*	%
School	137	104	75.9
Continuing education	140	88	62.9
Pre-professional	144	81	56.3
County	133	73	54.9
Reading coach	142	75	52.8
Florida Reading Initiative	104	28	26.9
Other	96	26	27.1

Note. f = frequency.

Teachers were asked to specify the total hours they had devoted to each professional development experience in which they had participated (Table 3). On average, teachers devoted the highest number of hours (M = 24.06, SD = 13.00) to Florida Reading Initiative training. Teachers spent the fewest number of hours (M = 14.43, SD = 11.838) training with their reading coach. The total number of hours participants reported in the different types of professional development programs were added to determine the total number of professional development hours. The mean total number of CARS professional development hours completed was 60.56 with a standard deviation of 52.20. The range was 312.

Table 3. Number of hours teacher devoted to CARS professional development

Training	*n*	Min.	Max.	M	SD
Florida Reading Initiative	35	0	>30	24.06	13.00
Pre-professional	73	0	>30	22.51	12.75
Continuing education	88	0	30	21.30	11.65
Other	22	0	>30	20.14	13.28
County	72	0	>30	16.44	11.39
School	99	0	30	14.58	10.95
Reading coach	77	0	>30	14.43	11.89

Note. Min. = minimum; Max. = maximum.

Objective 2: Determine the Stages of Concern of agriscience teachers who have completed a CARS professional development program: An overall concerns profile (Figure 1) was developed to illustrate the concerns of the population regarding implementing CARS into the agriscience classroom. *Unconcerned* was the primary stage of concern with a percentile score of 91. Informational, personal, and management concerns were relatively high. The lowest SoC was consequences, followed by collaboration and then refocusing.

A group concerns profile was developed for teachers who reported receiving CARS professional development (Figure 1). The primary SoC for the group concerns profile was Stage 0, *unconcerned*, with a 96th percentile score. The secondary SoC for this group was *management*, Stage

4, with an 80th percentile score. These teachers also had high concerns in the informational and personal stages. Their lowest SoC was consequences with a 33rd percentile score. Collaboration and refocusing scores for this group were around the 50th percentile.

Objective 3: Determine the Stages of Concern of agriscience teachers who have not completed a CARS professional development program: A group concerns profile was created for teachers reporting having no CARS professional development (Figure 1). The primary SoC for this group was *unconcerned*, Stage 0, with a 91st percentile score. This concern was followed by *informational*, Stage 1, and *management*, Stage 4, both with an 88th percentile score.

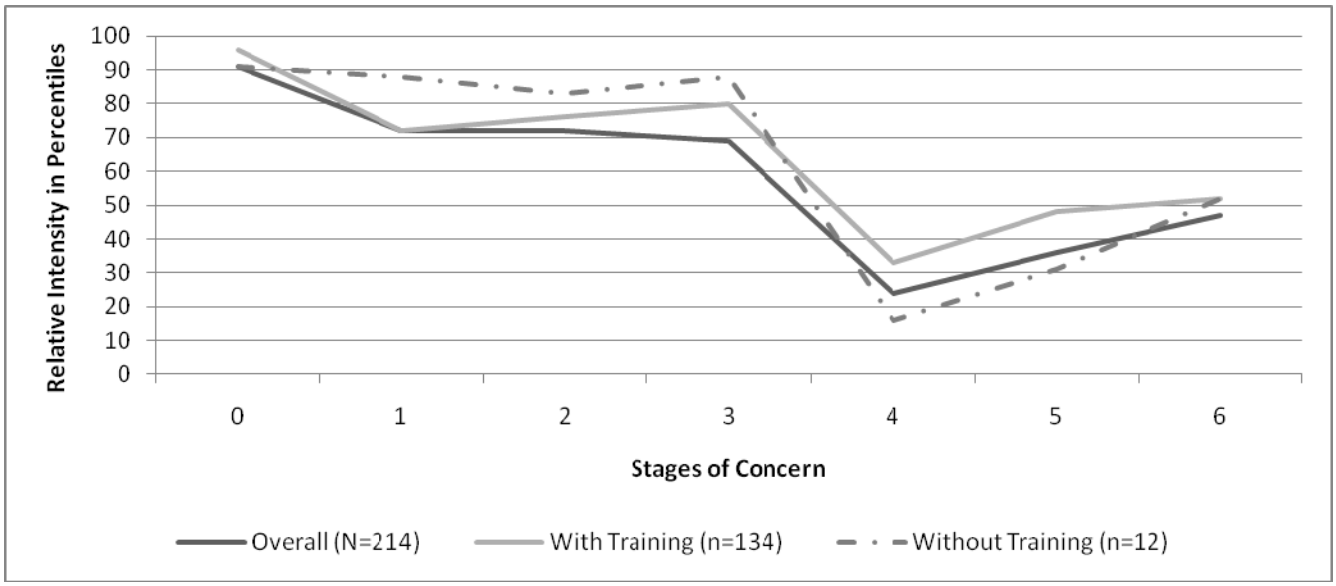

Figure 1. CARS concerns profiles

Conclusions & Recommendations

Conclusion 1: The overall concerns profile for agriscience teachers is a non-user profile: According to George, Hall, and Stiegelbauer (2006), the overall concerns profile was that of a *typical nonuser*. Figure 2 illustrates the common user profiles and their hypothesized progression. When evaluating group data, one must consider that it will be affected by "dominant high and low Stages of Concern" (George et al., 2006, p. 34). Based upon the overall profile, as a whole, respondents were not entirely aware of the innovation or focused on other innovations and obligations. However, relatively high scores in Stages 1 and 2 indicated a possible interest in learning about the innovation. Teachers were not intensely concerned about consequences or collaboration with this innovation. The *tailing-up* of the profile at Stage 6 signified that the teachers may have other ideas which they think deserve more time and attention and that they may be resistant to change.

Hall and Hord (2006) underscore, "the crucial step in using [concern profiles is] to make *concerns based interventions* that will be able to resolve the concern and move the person toward more advanced use of the innovation" (p.142). Continued interventions and support should be utilized to assess and address teacher resistance and to help these teachers progress through the implementation of

CARS. Until the teachers have fully implemented CARS, no research on the effectiveness or student outcomes can be completed, because there will be no change in outcome until there is a change in behavior (Hall & Hord,).

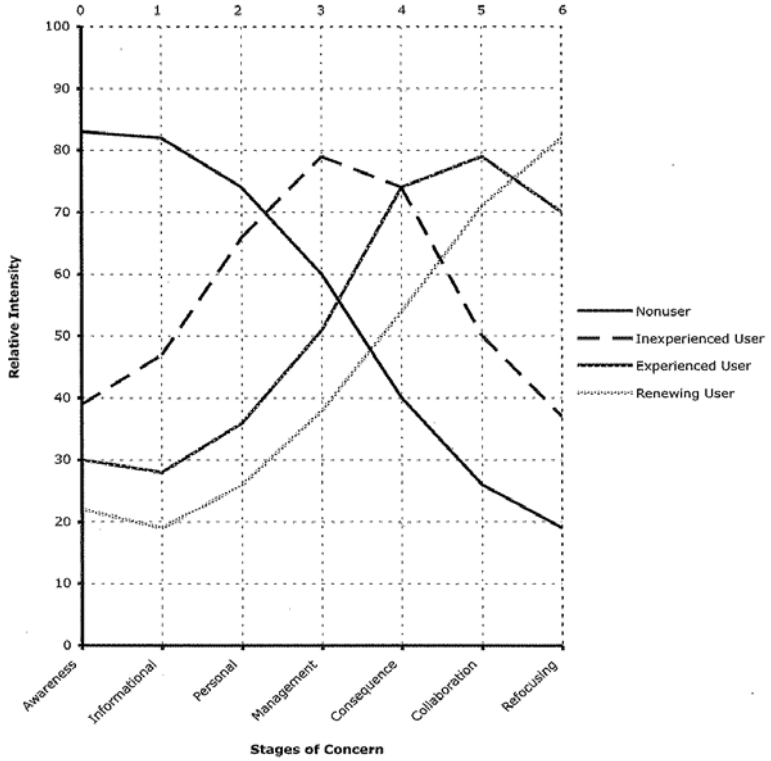

Figure 2. Hypothesized development of Stages of Concern (George et al., 2006, p.36).

Conclusion 2: In general, agriscience teachers show resistance to the CARS innovation: A majority of the group concerns profiles had a *tailing-up* of Stage 6 which in a non-user profile indicates a resistance to change (George, Hall, & Stiegelbauer, 2006). George et al. states that when the tail increases more than 10 percentile points, it should be considered an alarm.

Since agriscience teachers interact often through various regional, state, and national events, they have a unique user system culture which affords them the opportunity to discuss current educational problems or innovations. This time allows for constructive or destructive mushroom interventions to emerge. If teachers who disapprove of the innovation take the opportunity to express their disproval and persuade others against the innovation, it could be detrimental to the innovation. On the other hand if teachers use the time to support the innovation and collaborate, the interaction between these teachers could support the implementation of CARS.

Change Principle 11 notes, "appropriate interventions reduce resistance to change" (Hall & Hord, 2006, p. 13). Hall and Hord define interventions as "various actions and events that [change leaders] and others take to influence the [change] process" (p. 8). They suggest that change facilitators need to identify one of three reasons for resistance so each may be addressed through an appropriate intervention either individually or within the whole group. Research and interventions should assess and address the cause of agriscience teachers' resistance. Possible sources may be attitudes, knowledge,

philosophy, perceptions and conceptions, and motivation. If professional development addresses the causes of resistance before covering the strategies, teachers may be much more attentive and willing to implement CARS.

Conclusion 3: Agriscience teachers are not focused on the consequence of implementing CARS or the potential for collaboration: The consequence SoC was consistently the lowest SoC which indicates, agriscience teachers do not realize how the implementation of CARS will affect students' learning. An understanding of the direct benefits of CARS to students and teachers may lower awareness scores and increase consequences scores. Professional development programs should focus on marketing the benefits of CARS implementation to the teachers. Teachers might then recognize CARS as a valuable teaching tool rather than another mandate.

Collaboration concerns were also scored consistently low. If teachers are not collaborating, they are missing opportunities to share applications of CARS. Change Principle 9 asserts, "the school is the primary unit for change" (Hall & Hord, 2006, p. 12). Although change must first occur in the individual, successful organizational change must occur on a school level. For school-wide change to occur, collaboration is required among teachers and between the teachers and the change facilitator team. Collaboration should be encouraged to foster implementation. By learning from each other and sharing their experiences teachers could decrease concerns in the informational, personal, and management stages and increase concerns in consequence stages. Research should investigate the effects of teacher collaboration on progression through the Stages of Concern and the implementation of CARS. Professional development programs and school systems should focus on ways to foster collaboration, such as a wiki or newsletter.

Conclusion 4: CARS professional development programs are not meeting the needs agriscience teachers; thus, these teachers are not progressing through the Stages of Concern and are not implementing CARS at a high level: The group concerns profile developed for teachers who had not completed CARS professional development is a nonuser profile with an additional peak at Stage 3 and a *tailing-up* of Stage 6. According to descriptions provided by George, Hall, and Stiegelbauer (2006), teachers in this group are likely more concerned with something other than the implementation of CARS and possessed high managerial concerns. Consequences and collaboration were both of low concern. This profile also had a strong *tailing-up* of over 20 percentile points. George et al. (2006) noted that this may show strong resistance to the innovation and suggested it be "heeded as an alarm" (p. 42).

Based on George, Hall, and Stiegelbauer's (2006) description of concern profiles, several conclusions can be drawn about the group concern profile of teachers completing CARS professional development. The high relative intensity score for Stage 0 indicated that teachers were more concerned about other responsibilities or innovations. The second peak at Stage 3 identified the strong management concerns, such as time and logistics. This profile indicated low interest in consequences of CARS and mild interest in collaboration on CARS. The *tailing-up* of the concerns profile at Stage 6 revealed that teachers had ideas about changing the innovation and may be resistant to the implementation of CARS. However, the *tailing-up* in this profile was slight and should not cause great concern.

According to George, Hall, and Stiegelbauer (2006) low scores in Stage 0 are indicative of individuals who view the innovation as important to his or her work. On the other hand, high scores

indicate that other innovations or consideration are of greater importance to the teacher. This explanation of the awareness concern can explain the consistently high awareness SoC. Agriscience teachers have many responsibilities and have not bought into the CARS innovation. They may view the innovation as just another mandate which adds to their work load. Reform-related trainings should address the personal concerns of the participating teachers (Aneke & Finch, 2001). By administering the Stages of Concern Questionnaire prior to a professional development program, instructors can assess and address the concerns of the participants through the training. Hall and Hord (2006) recommend using open-ended concerns statements before and after professional development programs to identify, target, and assess development of teachers' Stages of Concerns through the program which should increase the quality and effectiveness of the professional development. Baker et al. (2004) suggested making a smooth and gradual transition so that the innovation *enhances* teaching instead of asking teachers to make a drastic change in the teaching methods. Specifically, CARS professional development for agriscience teachers should focus on the areas those teachers have identified: "where, how, and why to use CARS in their agriscience courses" (Park, 2005, p. 138-139).

Based on this study, the researcher suggests that practitioners consider the following recommendations:

1. A consistent, in depth professional development program should be implemented to provide ongoing training and support of the innovation throughout a several year process.
2. Schools should utilize Stages of Concern questionnaires and interventions to identify and attend to concerns which need to be addressed by professional development.
3. Professional development trainers should address the Stage 6 concerns in order to decrease resistance to the innovation.
4. School systems and school systems should encourage teacher collaboration to foster CARS implementation.

This study has identified the need for research in the following areas:

1. Research should be completed to develop an Innovation Configuration which would provide a more unified vision for CARS implementation.
2. Research should be conducted to verify the concern profiles developed in this study.
3. In order to better understand the effectiveness of the professional development programs, research should be conducted to determine the characteristics and effectiveness of various CARS professional development programs to design more effective and efficient programs.
4. Research should be conducted on the types of interventions agriscience teachers receive for CARS implementation and the effects of the identified interventions.
5. Researcher should identify the sources of resistance agriscience teacher have about CARS.
6. Research should investigate the effects of teacher collaboration on progressing through the Stages of Concern and the implementation of CARS.
7. Research on the outcomes of CARS should not be performed until successful implementation can be documented.

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Agriscience Teacher's Concern Profiles for Content Area Reading Strategies

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Discussant Remarks- Jacquelyn Deeds, Ph.D. Mississippi State University

Change is difficult for everyone and monitoring change and acceptance is a challenge. This paper did just that. I found the paper very interesting and the learned some new concepts in the process. This study looked at the stages of concern in the adoption of the CARS in Florida. CARS has been a considerable effort in the state and teachers have received a variety of professional development opportunities related to the subject.

The paper was well written and provided the reader with the background necessary to understand the concepts measured in the study. The authors are to be complemented on using a wide range of information and sources. Looking outside agricultural education is a good way to bring the focus back.

The methodology was clear and the instrumentation full developed. I would like to have known when the study was done. Follow-up of non responders was determined using early and late respondents. The population of agriscience teachers in Florida was known and non respondents could have been accessed. It is clear the instrument could not be administered by phone but I would like to have seen at least the demographic information compared or selected items from one of the stages of concern.

The findings were well presented which made the conclusions and recommendations easy to follow and clear. The conclusions included the concept that "despite all the professional development and emphasis place on CARS teachers are non-adopters and resistant to change. " (My words) This is a finding consistent to many other innovations in agricultural education from curriculum adoption to SAE programs.

This raises some questions:

What can we do to help agricultural educators accept change and new ideas?

How does this study inform the adoption of other concepts such as the National Quality Program Standards?

The Influence of Past Experiences on the Motivation of Adult Volunteers

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Abstract

From its' conception, 4-H has encouraged volunteerism and utilized volunteers to accomplish its' mission - to assist youth in acquiring knowledge, developing life skills, and forming attitudes that will enable them to become self-directing, productive and contributing members of society. The purpose of this study was to explore and describe the factors that motivated Georgia 4-H camp volunteers to volunteer with 4-H youth. The Volunteer Functions Inventory was used as the theoretical base for this study. The Values construct (M = 3.68) of the VFI was the highest motivating factor of adult 4-H volunteers. The Understanding construct (M = 3.39) ranked the second highest motivational factor in volunteerism followed by Social construct (M = 3.28), the Enhancement construct (M = 3.05), the Protective construct (M = 2.78), and the Career construct (M = 2.61) was the least motivating factor to adult volunteers. It was also found that participants that were not involved with 4-H as a youth volunteered more days per year than did participants who were former 4-H members.

Introduction

4-H is a youth organization directed by the State Cooperative Extension Service with the mission to **"**empower youth to reach their full potential, working and learning in partnership with caring adults" (National 4-H Council, 2008, paragraph 1). 4-H is home to over 6.5 million members from ages 5 to 19 in all 50 states (National 4-H Council, 2008). 4-H learning experiences focus on agricultural and environmental issues, agriculture awareness, leadership, communication skills, foods and nutrition, health, energy conservation, and citizenship through hands-on learning. This hands-on approach to learning is implemented through tools such as volunteerism, community service, and service-learning which provide meaningful and educational experiences to fully engage youth (Safrit & Auck, 2003). "4-H Youth Development Programs are essentially focused on creating opportunities for youth to meet developmental needs and to build important life skills" (National 4-H Headquarters, 1999, paragraph 2).

For the past 106 years, 4-H has been helping children and youth reach their fullest potential through learning new life skills, meeting new people, learning responsibility, and building self-confidence (Asthroth & Haynes, 2002). "The 4-H model emphasizes four basic developmental needs: belonging, mastery, independence and service" (Iowa State University Extension, 2008, p. 1). Youth who engage in 4-H activities and seek support from parents, Extension Agents, and community members are likely to grow into helpful members of their families and upstanding community citizens living a productive and satisfying life (Iowa State University Extension, 2008).

From its' conception, 4-H has encouraged volunteerism and utilized volunteers to accomplish its' mission - to assist youth in acquiring knowledge, developing life skills, and forming attitudes that will enable them to become self-directing, productive and contributing members of society. 4-H'ers are taught to be "productive and contributing members of society" or volunteers through hands on learning experiences (Georgia 4-H, 2005). 4-H is a club founded on the energy of volunteers who comprise the inner-workings of 4-H; they are the nuts and bolts, the behind-the-scenes individuals that are essential to the success of 4-H clubs around the country (Riley, Schott, & Schultinik, 2001). Without the presence of volunteers 4-H clubs could not fulfill their mission of impacting communities by developing upstanding youth and young adults.

The vision of National 4-H is to "connect young people with caring adults leading to positive outcomes for youth" (National 4-H Headquarters, 2008). It would benefit Cooperative Extension personnel to pinpoint specific individual characteristics that good volunteers possess, and to recruit them so they may have a hand in carrying out the 4-H mission. Having this knowledge may influence how youth programs are developed and presented. Extension Agents through youth programming may plan more community service activities or change how they are conducted in order to influence youth to become more actively involved within their communities as future adult volunteers.

Working with volunteers is an Extension tradition as well as the primary method of delivering 4-H programs, volunteer leaders have been central to the success of the 4-H program since its inception (Culp, 1996; Patton, 1990; Wessel & Wessel, 1982). Extension professionals engage volunteers by involving them in a variety of roles and delegating to them responsibility for projects, programs, events, and activities.

With the current fiscal climate of state and federal funding cuts, the accountability of state agencies becomes very important. To meet these accountability requirements it is important to have supportive evidence at hand that demonstrates the importance and necessity of 4-H (Boyd, Herring, & Briers, 1992). One approach to determining the true effectiveness of 4-H is to survey adults who once were active 4-H members (Ladewig & Thomas, 1987). Adults have had years to realize and put into practice the many life-long skills they may have learned while in 4-H. A number of studies have been conducted to determine if participation in 4-H as youth effect member's volunteerism tendencies as adults (Ladewig & Thomas, 1987; Maass, Wilken, Jordan, Culen, & Place, 2006; Pennington & Edwards, 2006).

Ladewig & Thomas (1987) compared volunteerism among 710 former 4-H members, 743 members of other organizations, and 309 nonparticipants in youth organizations. Results from adults in volunteer roles at community events and organizations were limited; though, 4-H alumni tended to be more involved in community activities than members of other youth organizations. Also, 4-H alumni are more likely to involve their children in the 4-H program and possibly become adult leaders themselves. In terms of adult community involvement, the oldest and most educated 4-H'ers was the most active in community activities as well as Cooperative Extension.

Mass, Wilken, Jordan, Culen, & Place (2006) surveyed 223 Oklahoma 4-H alumni to determine how 4-H alumni attribute their life skills to membership in 4-H and other youth development organizations. 4-H Alumni reported "Community Service Volunteering" as the second highest life skill that they attributed to 4-H and 45% of the respondents presently volunteer with 4-H.

Research conducted by Pennington and Edwards (2006) also compared 4-H with other youth development organizations and addressed two specific questions – (1) Does 4-H make an impact on the civic engagement of adults? (2) Do former 4-H members view the impact as being greater than that of other programming? The study was based on a population sample of 356 former Oklahoma 4-H Key Club members. Ninety-five percent of the sample served as volunteers. More than half volunteered 11 or more hours each month.

As previously stated, volunteers are a strong force behind the success of 4-H programming. "Volunteers are the base of many of our programs, whether they volunteer on boards, as 4-H leaders or as Master Gardeners, each volunteer breathes new vigor into our programs" (Riley & Schott, 2001, p.1). Volunteers are an integral part of Cooperative Extension and 4-H clubs; they have been the key to success of 4-H programs since the club's inception (Wessel & Wessel, 1982). With the current fiscal climate of state and federal funding cuts fewer resources are available for 4-H Agents to utilize, making the contributions of 4-H volunteers essential (Patton, 1990). "Extension professionals engage volunteers by involving them in a variety of roles and delegating to them responsibility for projects, programs, events, and activities" (Culp, McKee, & Nestor, 2007, p.1).

Nationally, 4-H relies on nearly 440,000 volunteers to deliver youth development programs (National 4-H Headquarters, 2007). Individuals serve as 4-H adult volunteers for many reasons, but a major driving force behind 4-H volunteerism is that adult volunteers view the 4-H club as a credible, worthwhile, useful, and beneficial organization by which they enjoy making a difference in the lives of youth and receive satisfaction by helping others and becoming a part of the 4-H family (White & Arnold, 2003; Culp, 1997).

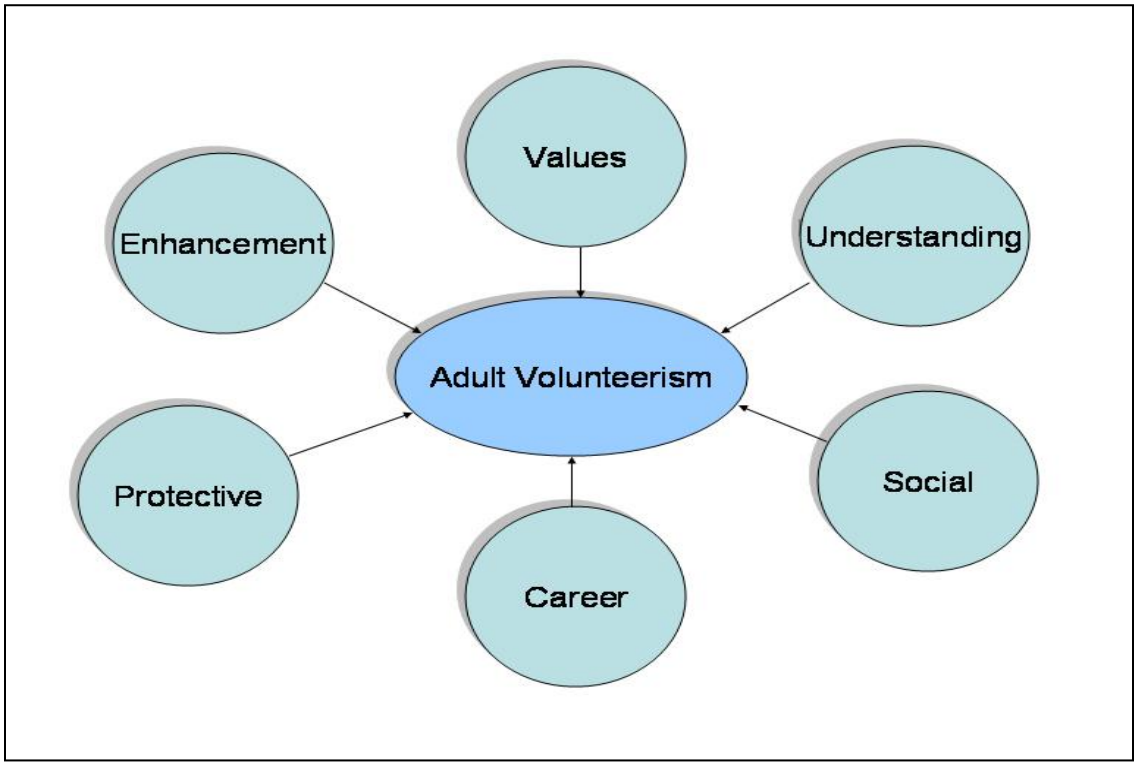
Theoretical/Conceptual Framework

The theoretical framework is framed within the Volunteer Functions Inventory (VFI) that is based on research conducted by Clary (1998), who approached volunteerism from a motivational perspective. Clary developed a motivational analysis which strives to understand

"the processes that move people to action – the process that initiate, direct, and sustain action" (Clary, Snyder, Ridge, Copeland, Stukas, Haugen, & Miene, 1998, p. 1517).

In order to answer these questions Clary adopted the functional analysis approach to motivation which is "concerned with the reasons and the purposes, the plans and the goals, that underlie and generate psychological phenomena – that is, the personal and social functions being served by an individual's thoughts, feelings, and actions" (Clary, et al., 1998, p. 1517).

Through the use of functional analysis Clary sought to determine the specific motivations that volunteers fulfill while participating in community service activities. By analyzing the motivations that are fulfilled by participation in volunteer service, six motivational functions served by volunteering were identified: values, understanding, social, career, protective, and enhancement (Clary, et al., 1998). These six functions are as follows (Figure 1): 1.Values: express values and beliefs related to unselfish humanitarian desire to help others; 2. Understanding: involvement in activities to satisfy a desire to learn; 3. Social: opportunity to be with one's friends and to engage in favored activities; 4.Career: obtain potential career-related benefits; 5. Protective: escape from negative qualities or feelings related to ego; and 6.Enhancement: enhancing an individual's self-esteem and ego (see Figure 1).



Clary, et al., (1998) concluded that the core propositions of a functional analysis of volunteerism are that acts of volunteerism that appear to be quite similar on the surface may reflect markedly different underlying motivational processes and that the functions served by volunteerism manifest themselves in the unfolding dynamics of this form of helpfulness, influencing critical events associated with the initiation and maintenance of voluntary helping behavior.

What factors motivate individuals who volunteer their time and talents to the Georgia 4-H youth camp programs? Are adults in Georgia motivated to volunteer because of past experiences with 4-H? How do [satate] adult volunteer demographics compare to 4-H volunteers in previous research? How does each of the six VFI constructs play a part in volunteerism among adults? This study sought to answer the aforementioned questions.

Purpose and Objectives

The purpose of this study was to explore and describe the factors that motivated Georgia 4-H camp volunteers to volunteer with 4-H youth. Within this study the following research objectives were addressed:

1. Describe the participants based on demographic characteristics;
2. Determine the motivational characteristics of the volunteers based on the Volunteer Functions Inventory: Values, Understanding, Social, Career, Protective, and Enhancement (Clary, et al., 1998); and
3. Using selected variables, determine if differences exist between volunteers that participated in 4-H as a youth and those that did not.

Methods and Procedures

The research method employed in this study was a survey, *used to explore and describe* the factors that motivate adults to volunteer with 4-H youth (Ary, Jacobs & Razavieh, 2002; Miller, 2006). The population studied was a convenience sample of 4-H adult volunteers attending Georgia 4-H Summer Camp in 2008. There were no attempts to generalize with this sample. Previous research has effectively used convenience samples for research (Culp & Schwartz, 1998; Williams, Fraze, Burris, Akers, & Green, 2008; Smith, Park, & Sutton, 2007; Jennings, Brashears, Burris, Davis, & Brashears, 2007; Kitchel, Jenkins, & Robinson, 2007). The accessible population were adult volunteers at 4-H youth camp. Questionnaires were delivered to Camp Managers at each camp who distributed them to adult volunteers at 4-H camps and asked the volunteers to complete and return them during their week at camp. Of the approximately 300 adult volunteers at the camps, 81 returned their questionnaire, providing a response rate of 27%. Because a non-random sampling method was used and no control for non-response could be implemented, the findings of this study cannot be generalized beyond the participants. However, the findings from this study are beneficial as they provide a baseline of information about adult volunteers which may be used for comparison purposes with future studies.

*The instrument used consisted of researcher developed demographic questions (*age, gender, ethnicity, marital status, education completed, employments status, occupation and previous youth organization participation) *and the Volunteer Functions Inventory (*Clary, Snyder, Ridge, Copeland, Stukas, & Haugen, 1998) which consisted of 30 questions which measured six motivation constructs: Protective, Values, Career, Social, Understanding, and Enhancement. Each question used a Likert-type scale that ranged between 1 and 4 (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree). The VFI is designed to measure the motivations of currently active volunteers, and was supported by existing research (Bradford & Israel, 2008; Clary, Snyder, Ridge, Copeland, Stukas, Haugen, & Miene, 1998; Clary & Snyder, 1999;

Esmond & Dunlop, 2004; Fletcher & Major, 2004; Okun, Barr, & Herzog, 1998). Validity and reliability of the VFI was previously established by the developers and was measured in this study (Table 1). Face validity of the current instrument was established by a panel of experts.

Table 1
Cronbach's Alpha for VFI

	Current Study	Clary et al. (1998)
Values	0.81	0.80
Understanding	0.85	0.81
Social	0.78	0.83
Enhancement	0.89	0.84
Protective	0.86	0.81
Career	0.90	0.89

Data was analyzed using SPSS 16.0. Frequencies and percentages were calculated for the purpose of analysis and interpretation of nominal data. Means and standard deviations were used to analyze and interpret interval data. To evaluate data, t-tests were computed to analyze means between groups (Miller, 1998).

Findings

Objective one sought to describe the demographic characteristics of the 4-H volunteers. The age range of the adult volunteers was between 22 and 69, with an average age of 44.5. Respondents volunteered between one and 300 days annually, with an average of approximately 51 days volunteered annually (Table 2).

Table 2
Participant Demographics

	Min	Max	Mean	Std. Deviation
Number of children (*n*=66)	0	8	2.28	1.178
Age (*n*=80)	22	69	44.58	10.743
Number of days volunteered (*n*=73)	1	300	51.88	55.096

Approximately sixty percent of the respondents were female, 83% were Caucasian, 20% had at least a bachelor's degree, and 79% were employed full time (Table 3).

Table 3
Adult Volunteer Demographics

		Frequency	Percent
Gender (*n*=81)			
	Female	49	60.5%
	Male	32	39.5%
Ethnicity (*n*=62)			
	Caucasian	52	83.9%
	Black	7	11.3%
	Other	2	3.2%
	Native American	1	1.6%
Education (*n*=81)			
	High School	11	13.6%
	Some College	24	29.6%
	Associates Degree	5	6.2%
	Bachelors Degree	16	19.8%
	Masters Degree	22	27.2%
	Doctorate	3	3.7%
Employment Status (*n*=81)			
(Some respondents were a combination of the following)			
	Student	5	5.6%
	Part-Time	4	4.9%
	Full-Time	64	79.0%
	Retired	13	16.0%
	Unemployed	2	2.5%
Marital Status (*n*=81)			
	Never Married	11	13.6%
	Married	59	72.8%
	Widowed	2	2.5%
	Divorced	9	11.1%
	Separated	0	0%

Data analysis revealed that 51% of the respondents did participate in 4-H as youth. Of those respondents, 88% attributed their present volunteer participation to their past 4-H volunteer service experiences (Table 4).

Table 4
Adult Volunteer Past Experiences

		Frequency	Percent
Did you participate in any 4-H volunteer service activities as a youth? (*n*=80)			
	Yes	42	52.5%
	No	38	47.5%
Do you attribute your present volunteer participation to your past 4-H volunteer service experiences? (*n*=42)			
	Yes	37	88.1%
	No	5	11.9%

An independent samples t-test was used with selected variables to determine if differences existed between participants that had participated in 4-H as a youth and those that had not. When number of days volunteered were compared between these two, a significant difference was found, with non-4-H participants volunteering more days per year than with participants that were previously 4-H members. VFI constructs were also compared and no significant differences were found between these two groups.

Table 5
t-tests for 4-H & Non-4-H Members

	4-H Member		Non-4-H Member		Significance
	N	*M*	*N*	*M*	
Number of days volunteered	43	37.07	30	73.10	0.005
VFI Protective	47	2.80	31	2.70	.504
VFI Values	47	3.68	34	3.66	.828
VFI Career	47	2.83	34	2.5	.093
VFI Social	47	3.23	34	3.28	.634
VFI Understanding	47	3.36	34	3.42	.522
VFI Enhancement	47	3.09	34	2.98	.392

Approximately 80% of the respondents stated that their children had been involved in a 4-H club (Table 6).

Table 6
Adult Volunteer's Children 4-H Involvement

		Frequency	Percent
Have your children been involved in the 4-H Club? (n = 69)			
	Yes	55	79.7%
	No	14	20.3%

Conclusions

Based on the study findings, numerous factors lead adults to volunteer with 4-H youth. The findings from this study support research by Ladewig & Thomas (1987), Maass, Wilken, Jordan, Culen, & Place (2006), and Pennington & Edwards (2006), which found that 4-H alumni attributed their present community involvement to life skills learned through 4-H.

The first objective was to describe participant demographics. This study found that the average age of adult volunteers at 4-H summer camps was 44.58 years old with the minimum age being 22 and the maximum age being 69. These findings are consistent with those of Culp, McKee, and Nestor (2005) who found through a national study an average volunteer age of 46.33.

Researchers tried to determine the average number of days per year an adult would volunteer. Findings indicated that adults volunteered an average of 51.88 days per year. When participants were grouped as having past 4-H membership significant differences appeared with Days Volunteered (p = 0.005). Sadly, 4-H alumnus (M = 37.07) volunteered fewer days on average than non-4-H members (M = 73.10). This information was crucial for the researchers to determine if individuals who participated in 4-H as youth were more likely to become volunteers in the future. This finding points out that past 4-H members volunteer less hours than non 4-H'ers

Of 81 respondents, 49 (60.5%) were female while 32 (39.5%) respondents were male. These results may reflect those of Georgia 4-H members. The 2007 Georgia 4-H Annual Report stated that active 4-H members were 53% female and 47% male (Georgia 4-H Foundation, 2007). Volunteer gender results in this study may be effected by adult volunteer cabin assignments during summer camp as regulations require, there must be at least one adult per cabin aligning with gender.

During this study 62 respondents described their ethnicity to be: 52 (83.9%) Caucasian, 7 (11.3%) Black, 2 (3.2%) Other, and 1 (1.6%) Native American. These results also correlate with those findings of the 2007 4-H Annual Report. According to the report 59% were white, 35% were black, 1.80% were unreported, 1.79% were Asian, 1.72% were Multi-race, 0.54% were American Indian, and 0.09% were Pacific Islander (Georgia 4-H Foundation, 2007).

Psychologists view community service through volunteerism "as an example of behavior that reflects a high level of human development" (Smith, 2005, paragraph 1). It would make sense that as the level of education attained increased, the more time the individual would

volunteer. Therefore, this study asked respondents of their educational status: High School 11 (13.6%), some college 24 (29.6%), Associates degree 5 (6.2%), Bachelors degree 16 (19.8%), Masters degree 22 (27.2%), and Doctorate 3 (3.7%). It seems that 4-H clubs may attract individuals that have pursued higher education as volunteers. Compared with the results from Culp, McKee, and Nestor (2005) respondents' educational level were as follows: Some high school (1.36%), high school graduate (30.43%), Certification (22.87%), Bachelor's degree (30.04%), Master's degree (13.76%), and Doctorate (1.55%).

Culp, McKee, and Nestor (2005) found that 68.22% of respondents have some form of education beyond high school level. Culp's statistic is similar but smaller than the findings of this study which found that 86.5% of respondents pursued education beyond high school. Likewise, results of the 2005 study found that 45.35% of respondents earned a Bachelor's degree or higher, while this study found a higher percentage of respondents 50.7% earning a Bachelor's degree or higher.

Many different individuals with unique situations are drawn to volunteering with 4-H youth. 4-H Agents should not withhold from asking individuals who work full-time, thinking they are too busy to volunteer. "The busier people's lives are the more likely they are to volunteer, be that through their workplace, church, community or children's school" (RTI International, 2006, paragraph 7). Findings from this study support the previous quote saying that busy people are more likely to volunteer than not. Seventy-nine percent of volunteers questioned worked full-time, while only 4.9% worked part-time; 16% were retired, 5.6% were students, and 2.5% were unemployed.

However, it is important to note that numerous respondents indicated on their questionnaire that they were unemployed due to retirement, and other respondents were students working part-time. These findings indicated that many volunteers were retired. The state of Georgia seems to have an able and willing retired population from which to recruit volunteers. A greater effort may need to be made to reach out to this population. These findings are somewhat similar to those of Culp, McKee, & Nestor (2005) which found 61.7% of volunteers worked full-time, while 21.1% worked part-time, and 16.4% were unemployed.

This study found that 59 (72.8%) were married, 11 (13.6%) were never married, 9 (11.1%) were divorced, and 2 (2.5%) were widowed. These findings are similar to those of Culp (1996) who found that 7.89% of 4-H volunteer leaders were single while 87.25% were married.

The second objective was to determine the motivational characteristics of the volunteers based on the Volunteer Functions Inventory. Adult volunteers sacrifice many hours to supervise and coach 4-H youth, so it is no surprise that the Values construct ($M = 3.68$) was the highest motivating factor of adult 4-H volunteers. As previously stated, 42 respondents had been involved in 4-H as youth. It appears that 4-H alumni who volunteer at 4-H events understand the impressions the club has left on their lives, and in turn volunteer to enable today's youth to gain the same benefits. It may be fair to say that volunteers in general, disregarding their club affiliations, volunteer to help others and don't expect anything in return.

4-H's slogan is "Learn by doing", which provides the impetus for many 4-H events to have classes and learning opportunities incorporated into the schedule. While volunteering on behalf of others many adults gain knowledge through instructional courses taught at 4-H events, which may explain why the Understanding construct ($M = 3.39$) ranks as the second highest motivational factor in volunteerism.

In order for 4-H functions to take place volunteers must be present. Those adult volunteers who serve county 4-H programs continuously over a period of time meet new people and form a network of friends throughout the county, district, and state and look forward to meeting with their friends at 4-H events. 4-H functions are just as much of a social event for adults as it is for the children. Ranking as the third highest motivating factor for adult volunteers is the Social construct ($M = 3.28$).

The Enhancement construct ($M = 3.05$) ranked as the fourth highest motivational factor. Individuals who contribute their time and energy to humanitarian causes gain a sense of dependability and feel good about themselves, improving their self-esteem and ego. Individuals who volunteer time after time surely feel a sense of self gratification that influences them to continue volunteering.

The Protective construct ($M = 2.78$) which ranked fifth, relates to the Enhancement construct. Many adults live and work in a stressful, intimidating, and demoralizing environment, therefore 4-H provides an outlet or escape for those individuals. Feeling of self satisfaction that individuals gain from volunteering aides in the enlightening of the spirit and the healing of a broken ego.

Lastly, the Career construct ($M = 2.61$) was the least motivating factor to adult volunteers. If the Values construct was ranked first, then it would make sense that the Career construct would be ranked low. Individuals may not be thinking about benefiting their careers if they were volunteering for charitable reasons. Mass, Wilken, Jordan, Culen, & Place (2006) conducted a similar study announcing "the results of the study concluded that alumni of the Oklahoma 4-H program attributed the development of 26 of 36 identified life skills to 4-H" (paragraph 19).

Objective 3 was to determine if differences exist between volunteers that participated in 4-H as a youth and those that did not. This study sought to determine if youth activities from youth and college influence adults to volunteer, as recommended by Culp (1996) who found that adult volunteers who participate in 4-H do so primarily due to previous 4-H membership. The results of this analysis revealed that 42 (52.5%) respondents did participate in 4-H as youth

In conclusion, many unique individuals volunteer at Georgia 4-H Summer Camps for numerous reasons. These volunteer motivations need to be identified, analyzed, and shared with 4-H agents and Extension Service personnel to better match specific volunteer motivations to what 4-H has to offer, in hopes of discovering and recruiting potential new volunteers. Programs initiated through 4-H seek to "Make the best better" and in terms of civic engagement strengthens a youth's motivation and commitment to helping others in their community or neighborhood both currently and in the future. 4-H alumni, even after having left 4-H long ago,

view their 4-H experiences as positive. It appears that the experiences they had in 4-H continue to affect them in later life influencing them to become 4-H volunteers. Other individuals become 4-H volunteers because of their children's involvement. When children get involved in clubs or organizations some parents desire to become involved as chaperones, instructors, Scoutmasters, or coaches, actively becoming adult volunteers.

By using Clary's Volunteer Functions Inventory (VFI) it was revealed that participants volunteered at Georgia 4-H Summer Camps in 2008 predominantly due to the Values, Understanding, and Social constructs. It appears that 4-H alumni as well as non-4-H'ers understand the benefits and potential life changing opportunities available through the 4-H club and in turn volunteer to enable today's youth to experience those opportunities and to gain those benefits. Volunteering allowed participants to develop a new network of friends and may act as a temporary escape from day-to-day activities. These motivational functions seem to have strong influences on adult volunteerism at Georgia 4-H Summer Camps. Participants were more likely to become involved as 4-H volunteers due to previous 4-H membership and their own children's involvement.

Recommendations and Implications

The practical implications of this study are as follows:

- 4-H activities and curriculum positively influence youth and have lasting impacts throughout adulthood
- 4-H administrators should discover which motivational constructs volunteers seek and create volunteer experiences to meet those needs.

4-H administrators should:

- Recruit 4-H alumni as volunteers
- Recruit retired individuals to volunteer
- Recruit 4-H members' parents to volunteer
- Not be discouraged to ask full-time employees to volunteer
- Make sure that 4-H events are educational not only for the 4-H'ers but also for the volunteers
- Understand that 4-H functions are a social event for both 4-H'ers and volunteers
- Understand that 4-H functions act as an escape from home and work environments
- Understand that individuals volunteer based on a strong humanitarian desire to help others

This study utilized Clary's Volunteer Functions Inventory to identify particular adult 4-H volunteer motivations and discovered many interesting qualities of 4-H volunteers, revealing specific traits that 4-H Agents can use to their advantage, enabling them to pinpoint and recruit future volunteers. Although this study only focused on present volunteers and attempted to learn why they volunteer their time, energy, and expertise, it would be beneficial to determine the different motivational constructs between volunteers and non-volunteers. 4-H Agents are now aware of present volunteer motivations, but future studies are needed to enhance the knowledge of non-volunteer motivations, or the lack there of.

An interesting finding was that student volunteers did not have a very high Social construct score. As previously discussed, the Social construct describes the opportunity to be with friends and to participate in favored activities. Further testing should be conducted to determine why students differ so greatly on the Social construct than employed and unemployed individuals.

Future studies need to be conducted to either confirm or refute the findings that 4-H alumnus do not volunteer as many days on average as do non-4-Hers. If other studies do indeed discover that 4-H alumnus volunteer more than non-4-Hers, this information could be used by state 4-H administrators to promote 4-H clubs and used to provide evidence for continued state and local funding.

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The Influence of Past Experiences on the Motivation of Adult Volunteers

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The author(s) are to be commended for investigating such a practical and important concept in our profession. We know that many of our programs would cease to exist in agricultural and extension education without the support of volunteers. The author(s) do a nice job of laying a theoretical foundation for the study. The use of the VFI to quantify volunteer experiences was appropriate for this study.

When examining the purpose and objectives for the study one question arose. Some in our profession believe that the description of participant demographic variables is not an objective of a study; it is a mere description of the subjects in your study. I would revisit this in your manuscript before journal submission.

Although convenience sampling has been used in our profession, it is not the optimal method for soliciting response. An acknowledgement of this being a limitation to your study would be appropriate. I am confused about the inclusion of Table 1 in your manuscript. I understand the rationale for including the two sets of reliability estimates but I would not place this in tabular form.

The findings are relatively straight forward and simplistic. When looking at Table 2, what does all this mean to the study? It goes back to my earlier comment, is this a description of the population or an objective of your study? In Table 5 you report significance but there is no evidence of the *t* test in you tables. *T* values should be reported in the manuscript. Tables 4 and 6 add little to manuscript. These are really nothing more than added demographics.

The conclusions are a restatement of the findings and the recommendations and implications leave me with more questions? What does this mean for 4-H agents? What does this mean for 4-H program development specialist? Can we target specific audiences for recruitment of potential volunteers based on the profile you have?

This manuscript is an enjoyable read. It is well constructed and relatively free of grammar and spelling errors. The author(s) do a nice job of presenting relevant content in the area of volunteerism as it relates to our profession.

Identifying Outcomes from Participation in a Cooperative Extension County Program Review

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Abstract

Upholding and improving the quality of its educational programs has been a continuing priority for Cooperative Extension. The purpose of this study was to identify the outcomes resulting from conducting county program reviews in Florida. Extension agents in eight counties that participated in a 2008 county program review were surveyed to determine if their participation had affected their programming knowledge, attitudes, and behaviors. The results indicated agents increased knowledge of their programs' strengths and opportunities for improvement. Most agents took at least one programming action as a result of participating in the county program review, with an increased use of technology reported as the most common action taken. Fewer actions were reported at the county level. The county program reviews have the demonstrated potential to be a positive mechanism for improving programs. Cooperative Extension can maximize this value by communicating the importance of the county program reviews to agents and county offices, and by holding both accountable for their actions after a county program review.

Introduction

According to Morford, Kozak, Suvedi, and Innes (2006) "Extension organizations need to develop internal evaluation processes, support systems, incentive systems, and ways to enhance individual competencies to affect change in evaluation behaviors" (¶ 3). Houghton, Arrington, and Bradshaw (1994) suggested research is needed to identify the factors that motivate agents to be more effective in program planning. Radhakrishna and Martin (1999) said extension programs could be improved if agents developed a better comprehension of evaluation methods and how to utilize those approaches for program planning. The need for extension agents to report the outcomes from their programs is continually increasing (Radhakrishna & Smith, 2000). While the conventional approach to program improvement has focused on increasing agents' abilities to plan and evaluate their own programs, utilizing external feedback also offers potential for improving the quality of Extension's programs.

Kistler and Briers (2003) recommended extension programs should be continuously evaluated in order to measure quality and program impact. Towards this end a formal needs assessment process, known as a county program review, was re-instituted in Florida in 2007 to improve the quality of Extension programming delivered at the county level (Harder & Benge, 2009). Jacob, Israel, and Summerhill (1998) described county program reviews as "a

comprehensive assessment of the program delivery and educational services offered by the faculty and staff of a local Extension office" (¶ 1). Counties are selected by the extension administration to participate in county program reviews. Review teams of county and state extension faculty are formed based on technical expertise and the major program areas in the selected counties. The teams receive training at a workshop to increase each team member's knowledge of his/her role and the overall review process.

The selected counties participate in a two to four day review, based on the size of their county extension program. Faculty and staff in each program area and its corresponding stakeholders have a scheduled opportunity to dialogue with the review team. The review team also meets with a county administrator (e.g., county commissioner) during their visit.

The review teams are charged with developing a final report outlining the county's overall strengths, challenges, opportunities, and threats based on their observations and interactions with county faculty, staff, stakeholders, and county administration. Each individual program area is provided feedback regarding strengths and opportunities. Each county office is required to draft a response and subsequent plan of action based on the results of the review. This study was conducted based on Harder, Lamm and Strong's (2009) recommendation to determine what outcomes result from participating in the county program review process.

Theoretical/Conceptual Framework

Boyle's (1981) adaptation of Lewin's field theory of motivation provides the foundation for the theoretical framework. Lewin postulated individuals are holistically affected by their immediate environments. Changes in the environment may sometimes create disequilibrium for the individual when what is currently happening differs from what an individual perceives to be ideal (Boyle). This gap in conditions creates one or more needs. The resolution of needs leads to the restoration of equilibrium.

Witkin and Altschuld (1995) and English and Kaufman (1975) advocated the use of needs assessments as a systematic method of determining individual and organizational needs. English and Kaufman explained a needs assessment is a "tool which formally harvests the gaps between current results (or outcomes, products) and required or desired results, places these gaps in priority, and selects those gaps (needs) of the highest priority for action" (1975, p. 3). The results of a needs assessment can be used to develop plans for moving an organization towards its desired results (Witkin & Altschuld).

According to McLean (2006), the potential exists for positive and negative results to occur following a needs assessment. Included amongst the benefits of a needs assessment are increased effiency, increased motivation, greater synergy, and improved morale for an organization. Less desirable outcomes may include raising expectations to unachievable levels, assigning blame to specific individuals, benchmarking of low scores, and the disenfranchisement of workers (McClean).

A conceptual model for the needs resolution process (see Figure 1) was developed by Harder et al. (2009) from Boyle's adaptation of field theory and the work of English and

Kaufman (1975), Witkin and Altschuld (1995), and McLean (2006). Harder et al. examined the expressed and analyzed needs affecting the delivery of educational extension programs at the county level, as determined by conducting county program reviews. This study focused on a different aspect of the needs resolution model, namely the actions taken by extension agents and county-level Cooperative Extension following a county program review.

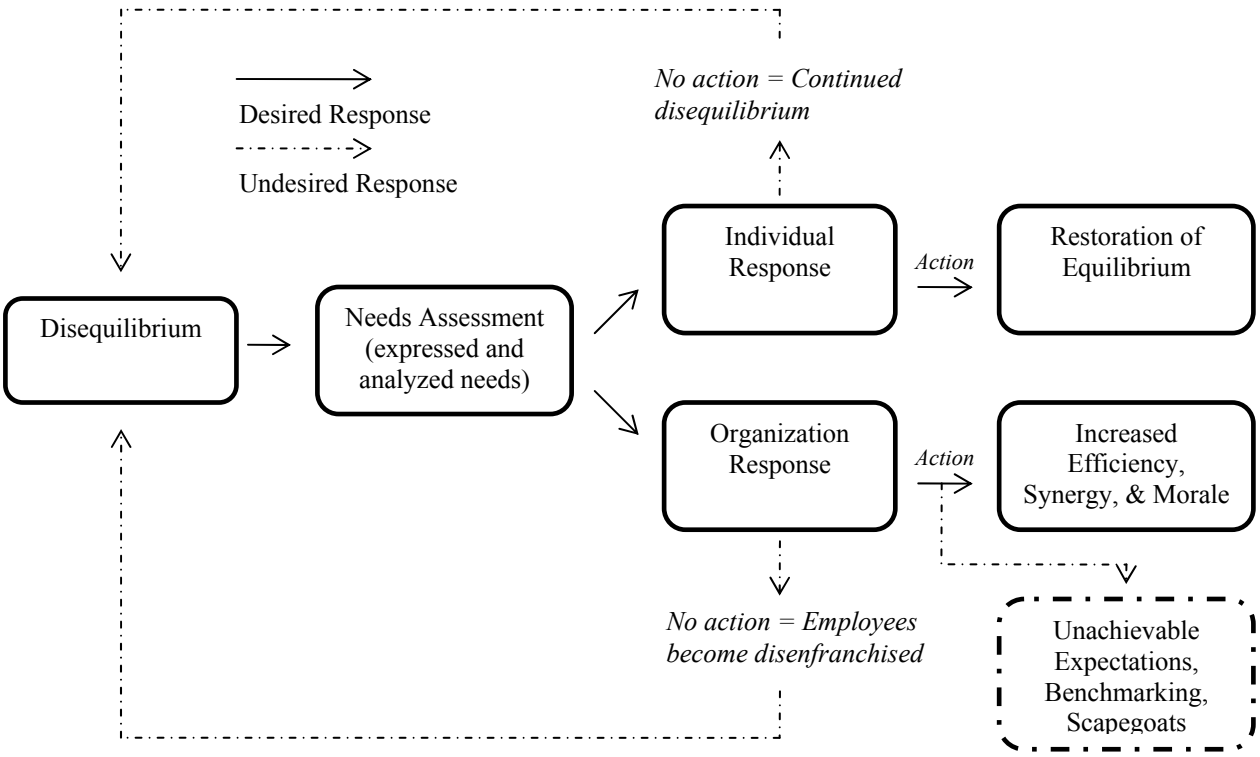

Figure 1. Model for the needs resolution process (Harder et al., 2009).

Note. From "An analysis of the priority needs of Cooperative Extension at the county level," by A. Harder, A. Lamm, and R. Strong, 2009, *Journal of Agricultural Education, 50*(3), p. 13. Reprinted with permission.

Purpose and Objectives

The purpose of this study was to identify the outcomes resulting from the county program review process in Florida. The first objective was to describe how extension agents perceived potential changes in their knowledge or attitudes resulting from participating in a county program review. The second objective was to describe the actions that extension agents took as a result of participating in a county program review. The third objective was to describe the actions taken at the county level as a result of participating in a county program review.

Methods/Procedures

This study was descriptive in nature. A census of the extension agents working in eight counties that participated in the 2008 county program reviews conducted by UF/IFAS Extension was taken approximately one year later. Seventy-five agents were still employed in the same counties when this study was collected, according to each county's Web site and the university's Cooperative Extension directory. Nine agents were no longer employed by Extension or in the same counties.

A researcher-developed questionnaire was used to collect data online using Survey Monkey. An expert panel reviewed it for content validity. Questions were developed from Rockwell and Bennett's (2004) Targeting Outcomes of Programs (TOP) model. Rockwell and Bennett (2004) theorized changes in knowledge, attitudes, skills, and aspirations (KASA) have to occur prior to changes in practice. According to Bennett and Rockwell, "practices are patterns of behaviors, procedures, or actions" (1995, ¶ 16). It is useful to assess both types of outcomes in order to understand what changes in practice may or may not have occurred and why. In the context of this study, changes in KASA were examined to help determine why extension agents and county offices did or did not take action (change practice) following their participation in a county program review.

The first section of the questionnaire asked agents to indicate their level of agreement for five Likert-type questions about KASA outcomes resulting from the county program reviews by using a six point scale (1 = *Strongly Disagree*, 2 = *Somewhat Disagree*, 3 = *Slightly Disagree*, 4 = *Slightly Agree*, 5 = *Somewhat Agree*, 6 = *Strongly Agree*). The scale was interpreted as follows: *Strongly Disagree* = 1.00 – 1.50, *Somewhat Disagree* = 1.51 – 2.50, *Slightly Disagree* = 2.51 – 3.50, *Slightly Agree* = 3.51 – 4.50, *Somewhat Agree* = 4.51 – 5.50, *Strongly Agree* = 5.51 – 6.00. Reliability for this section was calculated *ex post facto* at .91. The second section of the questionnaire contained two open-ended questions: (a) what changes did you make in your programs as a result of the county program review, and (b) what changes were made within your county office as a result of the county program review? A limitation of the study is the use of self-reporting.

Dillman, Smyth, and Christiansen's (2009) Tailored Design Method for Internet questionnaires was used to collect data. Of the original 75 addresses, 72 were valid. One reminder was sent in an effort to increase response rate (Dillman et al., 2009). A final response rate of 72.22% (n = 52) was obtained. Two participants opted out. There were eight responses removed due to missing or incomplete data. This reduced the number of usable responses to 42. No significant differences existed between early and late respondents when their quantitative responses were compared, therefore the quantitative results can be generalized to the target population (Lindner, Murphy, & Briers, 2001).

Descriptive statistics were used for the first objective. Content analysis was used for the second and third objectives. According to Merriam (1989), content analysis "involves the simultaneous coding of raw data and the construction of categories that capture relevant characteristics of the document's content" (p. 160). Triangulation was accomplished by having multiple investigators participate in the qualitative data analysis and a member check was conducted by e-mailing the results of the survey to respondents. An audit trail has been included

in the findings/results. These steps were taken to increase the trustworthiness of the study, as recommended by Lincoln and Guba.

Findings/Results

The first objective was to describe how extension agents perceived potential KASA outcomes resulting from participating in a county program review (see Table 1). Agents somewhat agreed participating in a county program review helped them to recognize the strengths of their programs ($M = 4.52$, $SD = 1.19$). Agents slightly agreed participating in a county program review: increased their awareness of opportunities to strengthen their programs ($M = 4.24$, $SD = 1.19$), increased their awareness of challenges affecting their county's ability to deliver educational programming ($M = 4.05$, $SD = 1.25$), helped improve programming in their counties ($M = 3.95$, $SD = 1.29$), and increased their knowledge of threats facing their county's ability to deliver educational programming ($M = 3.60$, $SD = 1.34$).

Table 1
Agents' perceptions of KASA outcomes

Statement	*M*	*SD*
The County Program Review helped me to recognize the strengths of my programs.	4.52	1.19
I increased my awareness of opportunities to strengthen my programs as a result of the County Program Review.	4.24	1.19
I increased my awareness of challenges affecting my county's ability to deliver educational programming as a result of the County Program Review.	4.05	1.25
I believe the County Program Review process helped improve programming in my county.	3.95	1.29
The County Program Review increased my knowledge of threats facing my county's ability to deliver educational programming.	3.60	1.34

Note. Scale: 1 = *Strongly Disagree*, 2 = *Somewhat Disagree*, 3 = *Slightly Disagree*, 4 = *Slightly Agree*, 5 = *Somewhat Agree*, 6 = *Strongly Agree*.

The second objective was to describe any actions that extension agents took as a result of participating in a county program review. Twenty-nine agents took at least one action. Seven agents indicated they had not taken any new actions following the county program review. The themes that emerged from the content analysis are presented in italics for emphasis.

The most prevalent action taken was an *increased use of technology*. Web sites were improved with more educational information (R14), general maintenance and the addition of a blog (R3). One agent indicated he/she made "more use of the website" (R10) while another did a "better job of making my advisory commitee [*sic*] aware of my website" (R12). Agents also increased their use of other technologies. An agent stated "I am in the process of changing some of the delivery methods, primarily by incorporating new technologies (Podcasts, narrated PowerPoints) into programing [*sic*]" (R34). Another agent stated "The biggest change was a shift

towards the exploration [of] how distance delivery technology can help in the delivery as well as the evaluation of my programs" (R42).

Agents reported *focusing their programs* as a result of participating in a county program review. Two agents (R2, R13) reported an increased focus on specific topics for their programs while another respondent (R25) decreased the number of environmental programs being offered. Similarly, an agent reported structuring "programs to suit very specific audiences" (R5). A different approach was taken by the agent (R26) who did not focus programs based on topics or audience, but rather was able to focus programming by incorporating measurable objectives.

An *increased emphasis on diversity* was evident. The emphasis included tracking the race and gender of program participants (R17) and changing press releases "to better feature affirmative action statements" (R19). Programmatically, agents reported planning "more programs in rural areas of the county" (R22), "increasing the number of non-traditional programs" (R23), and looking for "more opportunities for minority programming" (R30). Finally, the same agent who talked about changing press releases indicated he/she was also "searching for members of our advisory committee that will make it more culturally diverse" (R19).

An *increased focus on advisory councils* was the last of the common actions identified. Two agents made membership changes by establishing a membership rotation (R16) and adding a new member (R31). One agent "worked more with [my] advisory committee to identify program needs" (R14). The most intensive focus was evidenced by the respondent (R29) who reported:

> We held a TOTAL Advisory Committee [meeting] - with ALL advisory committee members invited to a dinner after the Review. They discussed the Review Teams Recommendations & provided timeframes for implementation. I will be forced :-) [*sic*] to review their recommendations. Our 2nd annual (now) Total Advisory meeting will be in August. I believe this effort is worthwhile and will keep me on task.

The third objective was to describe any actions taken at the county level as a result of participating in a county program review. Fourteen agents listed at least one action taken by their office. Ten agents indicated they did not know of any actions taken or that their office had not taken any actions. The themes that emerged from the content analysis are presented in italics for emphasis.

Improved office communication was the primary theme that emerged from the analysis of actions taken. One agent reported "There were more collaborations of programs throughout the office as a result of the review" (R18). Another agent stated "We are more aware now of each other's programatic [*sic*] efforts and see more of a big picture of the overall extension effort in the county" (R25). Communication with clientele improved in at least one office, according to the agent who reported "Clientele were directed to the correct contact person more frequently" (R5).

To a lesser extent, actions were taken to *increase marketing and visibility*. One county added a new office in the southern end of the county to better market its programs to the growing population in that area (R1). Another county "developed a marketing strategy and publication" (R26). Finally, an agent reported his/her office had "focused more on being visible and accesable [*sic*] to all of our very diverse county demographics" (R34).

Conclusions

The purpose of this study was to understand the outcomes resulting from conducting a county program review in Florida. KASA (Rockwell & Bennett, 2004) changes were observed. Agents increased their knowledge of: opportunities to strengthen their programs, the strengths of their programs, and the challenges and threats affecting their county's ability to delivery educational programming. They tended to believe the county program review process helped improve programming in their counties.

Changes in practice (Rockwell & Bennett, 2004) also resulted from the county program reviews. The most common actions taken by agents were categorized as: increased technology use, focusing programs, increased emphasis on diversity, and increased focus on advisory councils. The most common actions taken by county offices were categorized as improved office communication and increased marketing and visibility efforts. Fewer agents reported changes in practice at the county level versus individual program changes.

Implications

Witkin and Altschuld (1995) said the results of a needs assessment may be used to help move an organization towards its desired results. In the case of the county program reviews, the desired results are improved educational programs. This study showed agents appeared to gain a sufficient enough amount of knowledge during the county program review to prompt them to take actions to improve their programs. Most agents took at least one action, suggesting the county program reviews can stimulate agents to change their programming practices.

The needs resolution model developed by Harder et al. (2009) indicated there are individual and organizational benefits that may result when action is taken following a needs assessment. At the individual level, equilibrium is restored. Though this study did not explicitly seek to understand what the restoration of equilibirium means for an agent, it is logical to presume agents only took those actions they perceived to be beneficial. This is a promising finding as the organizational structure of Extension places the greatest amount of responsibility for educational program quality on the individual agent.

A lesser degree of effectiveness can be attributed to the effect that the county program reviews have at the organizational level. Only 35% of the responding agents indicated their offices had taken any kind of action following the county program review. That means the potential organizational benefits derived from conducting a needs assessment, such as the county program reviews, are going largely unrealized in the counties (Harder et al., 2008; McLean, 2006). County offices are missing opportunities to increase overall efficiency, synergy, and morale if they fail to act upon the results of the county program reviews. A potentially more

serious consquence is that employees may become disenfranchised if they believe the county program review process is not valued by the organization, as evidenced by a lack of organizational action. Disenfranchised employees will not be positive assets in the effort to increase educational program quality and may be less likely to sustain any positive changes in practice they made as individuals.

Recommendations

More research is needed regarding the effectiveness of conducting county program reviews as a method for improving the quality of educational programs. This study used self-reporting to measure the objectives; future studies may benefit from a more rigorous research design. The findings from this study show promising changes in practice at the individual levels, but it is too soon to know if these changes in practice will be sustainable. Research is needed to understand the long-term effects of the county program reviews. At the organizational level, research is needed to understand the barriers to taking action following the county program review.

Recommendations for practice are focused on encouraging agents and county offices to take action following participation in a county program review. The majority of agents and offices must "buy-in" to the value of the county program reviews in order for them to have long-term impact. While offices are supposed to outline plans for implementing the county program review recommendations in a written response, this has not always happened. Extension administrators must consistently communicate the importance of the county program reviews and hold agents and offices accountable for developing *and* implementing strategic plans. Doing so will be key to realizing the full benefits of the county program review process.

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Discussant remarks for: **Identifying Outcomes from Participation in a Cooperative Extension County Program Review**

Prepared by John Rayfield, Assistant Professor, Texas A&M University

The author(s) are to be commended for their work in investigating the impacts of program reviews in county extension programs. It is well documented in this paper and in the existing literature the importance of this process to county programs. The theoretical base and conceptual model used are most appropriate for the given problem.

The purpose and objectives of this study are clear, concise and stem from the literature and theoretical framework. Although I believe this is a descriptive study, I believe a more accurate description would be mixed-methods study. The researcher(s) use both quantitative and qualitative methods in the study. I am a bit concerned with pieces of the methodology. How were the eight counties selected to participate in this study? Was there any randomization or purely convenience? “Nine agents were no longer employed by Extension or in the same counties.” Do you believe the people who were no longer employed by extension responded in the same manner as those who were still employed? How did you controll for this?

According to my calculations, your response rate for the data set used in this study was 58.33%. I believe it is better to accurately report your actual data response rate, even if it is lower, than to stretch it into something that it is not. Qualitative methodology seems solid and well executed. Your findings are clear and easy to follow. I am puzzled by the statement that only 36 agents responded to objective two. This should probably be clarified.

Conclusions are basically a restatement of your findings. What can you conclude from this research? Implications of this study are right in track. Are there other recommendations for futeure research and for practice? I believe this section could be strenghthened greatly.

I commend the authors for tackling such a practical but important concept in extension programming within their state. I would encourage this line of inquiry on a much broader scope.

A Content Analysis of Teen 4-H Member Responses in Relation to the Factors that Affect Their Involvement in Pennsylvania 4-H Programming

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Abstract

Studies have shown that teenage 4-H member retention lies within the context of the program offerings (Lauver & Little, 2005; Ritchie & Resler, 1993). Content analysis was completed on data that was collected from apriori open-ended questions from a larger study. The questions were designed to provide rich data on 4-H members' personal accounts of their experiences within 4-H. The researcher classified opportunities for participation into three categories (based on the questions): most memorable 4-H experience, opportunities to plan 4-H events, and factors that would encourage increased participation and emergent themes were identified.

Introduction and Framework

Throughout history, community programs such as 4-H, Boy Scouts, Girl Scouts, the Boys and Girls Clubs of America, and the YMCA have promoted youth development by providing a safe environment where young people of all ages can explore personal interests and develop peer groups that share those same interests (Anderson-Butcher, Newsome, & Ferrari, 2003; Cano &

Bankston, 1992; Ferrari & Turner, 2006; Lauver & Little 2005; Weber & McCullers, 1986; Weiss, Little, & Bouffard; 2005; Wingenbach, Nestor, Lawrence, Gartin, Woloshuk, & Mulkeen, 2000). Community programs provide youth with various learning opportunities in order to acquire the skills needed so that they can make plans, overcome obstacles, and achieve desired ends (Larson, 2000). Dworkin, Larson, and Hansen (2003, p. 25) reported that "…youth activities such as sports, arts groups, and organizations" provide learning opportunities that encourage members to be "…agents of their own development." The learning opportunities (i.e. goal setting workshops, structured planned practices, teamwork activities, leadership roles) allow members to improve time management skills, conduct business with adults, and improve their public speaking, confidence, and teamwork skills (Dworkin et al., 2003).

Pennsylvania4-H members are provided learning opportunities through participation in 4-H projects. The project curriculum areas offered through Pennsylvania4-H are: *animal science, citizenship and civic education, communication and expressive arts, environmental and earth sciences, family and consumer science, healthy lifestyles education, intergenerational programming, leadership and personal development,* and *science and technology* (Pennsylvania4-H, n.d.). Pennsylvania4-H also provides additional learning opportunities to members through various activities and events: *State Leadership Conference, Capitol Days, State 4-H Achievement Days, County Ambassador Program,* and *State Council.*

Membership recruitment and retention are challenges faced in 4-H, particularly when referring to older youth (Harder, Lamm, Lamm, Rose, & Rask, 2005). Between 2001 and 2007, Pennsylvania4-H has experienced a decline in overall membership. Membership in 2001 exceeded 123,000 which dropped to under 93,000 by 2007 (Pennsylvania4-H, 2007). All membership statistics exclude cloverbud members. Even though an overall decline in membership was evident across age groups, enrollment of 13-18 year old club members have been consistently lower since 2001 with a slight increase in membership in 2006-2007 (see Figure 1).

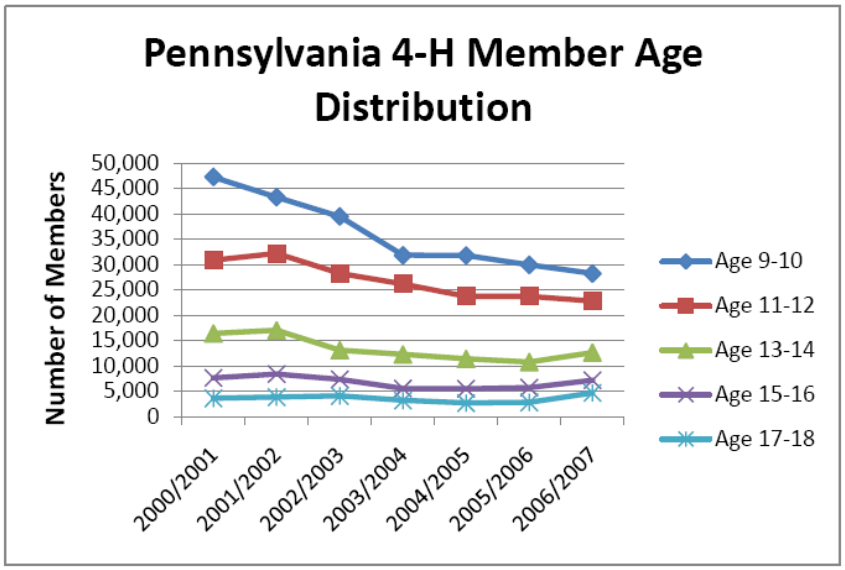

Figure 1. Pennsylvania4-H Membership (Excluding Cloverbuds) from 2001-2007.
Source: Youth Development Annual Report, Pennsylvania4-H.

In the context of 4-H participation, youth involved in 4-H are presented with various opportunities and activities to participate. Research advocates that recruitment and retention programs geared towards teenagers are needed in 4-H and other youth programs (Anderson-Butcher, Newsome, & Ferrari, 2003; Ferrari & Turner, 2006; Huebner & Mancini, 2003; Lauver, Little, & Weiss, 2004; Lock & Costello, 2001). Teens can serve as an important resource by providing valuable educational experiences for younger members (Ponzio, Junge, Smith, Manglallan, & Peterson, 2000). Thus, retaining older members strengthens their skills, while enhancing the learning experiences of younger members and reducing the workload of volunteers (Cantrell, Heinsohn, & Doebler, 1989).

Studies have shown that teenage 4-H member retention lies within the context of the program offerings (Lauver & Little, 2005; Ritchie & Resler, 1993). If 4-H programs appear to be of low quality and do not meet the needs of teens, then teens will look elsewhere to fulfill those needs (Acosta & Holt, 1991; Ferrari & Turner, 2006; Harder et al., 2005; Lauver & Little; Radhakrishna, Leite, & Hoy, 2003; Ritchie & Resler). According to Acosta and Holt (1991, p. 4), "designing programs to meet felt needs of clientele is definitely the key to maintaining involvement…" Additionally, overall program quality plays a key role in retaining members in youth community programs (Acosta & Holt; Ferrari & Turner, 2006; Harder et al., 2005; Lauver & Little; Radhakrishna et al., 2003; Ritchie & Resler, 1993).

A conceptual framework based on McClelland's motivational needs theory (McClelland, 1987), links the opportunities available to 4-H members to factors affecting member retention (see Figure 2). McClelland's theory consists of three motivational factors: a need for achievement, a need for affiliation, and a need for power (Rohs & Anderson, 2001). According to the conceptual framework, the need for achievement can be met through the projects that members complete and the goals that they reach. The completion of projects and goals are recognized in various forms through 4-H; money, prizes, or awards. The need for affiliation can be met through the relationships made with friends, parents, siblings, and 4-H leaders. Leadership roles such as serving as a committee chair, mentoring a younger 4-H member, serving as a teen leader, serving as a club officer, or being a member of the state 4-H council are offered to 4-H members and assist in meeting the need for power (see Figure 2). The opportunities and factors that are noted in the conceptual framework play a key role in the overall quality of a 4-H program.

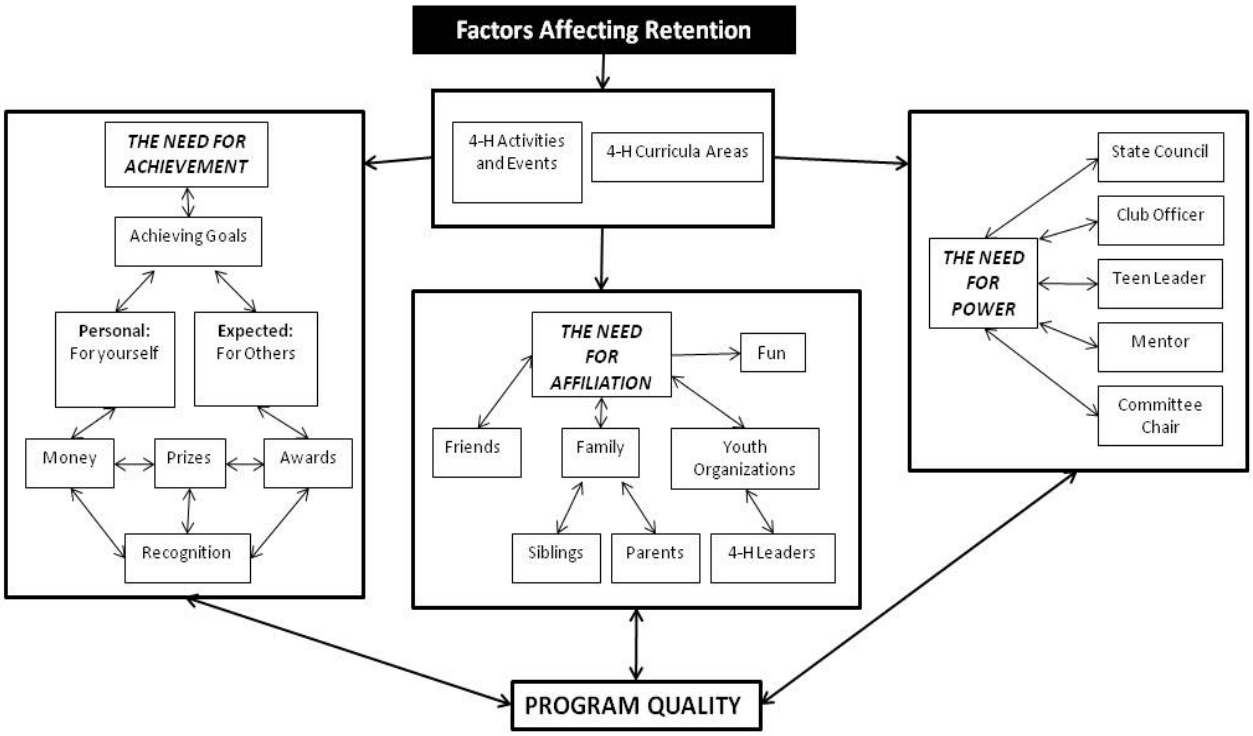

Figure 2. Conceptual Framework of Factors Affecting Retention, Based on McClelland's Motivational Needs Theory.

The Need for Achievement: Members with a high need for achievement do not like tasks that are too easy or too hard (McClelland, 1987). Individuals with a high need for achievement "are goal oriented and set moderate, realistic, attainable goals (Lussier & Achua, 2001, p. 42)." Research shows that teens enjoy achieving goals, whether these goals are set personally or by others (Dworkin et al., 2003). Achieving goals within the 4-H program can result in recognition in the forms of verbal praise, awards, prizes, and sometimes money (see Figure 2) (Pennsylvania4-H, n.d.). By providing the aforementioned opportunities for recognition and goal achievement, 4-H can better meet the needs of teens.

The Need for Affiliation: Individuals with a high need for affiliation seek close relationships with others, want to be liked by others, enjoy social activities, and seek a sense of belonging (Lussier & Achua, 2001). "Having a sense of belonging motivates young people to show respect and concern, as well as making them more receptive to guidance from other community members (Hensley, Place, Jordan, & Israel, 2007, p. 3)." Additionally, when youth feel valued and needed, the sense of belonging is increased and youth are more likely to remain involved in 4-H (Minnesota Extension Service, 1996). Ferrari and Turner (2006) reported that continued participation in 4-H resulted from youth feeling comfortable and connected. According to McClelland (1987), individuals with a high need for affiliation have a tendency to reflect upon relationships with others. Relationships within the 4-H program could involve

friends, family members, or 4-H leaders (see Figure 2). Relationships made within 4-H must be positive and proactive towards the 4-H, for members to remain involved (Wingenbach, Meighan, Lawrence, Gartin, & Woloshuk, 1999).

The Need for Power: Individuals with a high need for power are driven by influence and control (McClelland, 1987). McClelland recognized that there are negative and positive aspects when considering power. The negative aspect arises when individuals are concerned with controlling or dominating a situation. When individuals exercise skills of persuasion or inspiration to help improve others, the positive aspect can be seen. The 4-H program focuses on the positive aspect of McClelland's theory by providing leadership opportunities for 4-H members. Specific leadership opportunities available to 4-H members include the chance to serve as a chair of a committee, mentor a younger 4-H member, be a teen leader, serve as a club officer, or serve as an officer of state 4-H council, (Pennsylvania4-H, n.d.) (see Figure 2).

Motivation differs from one individual to another (Brennan, Barnett, & Baugh, 2007; Lock & Costello, 2001). McClelland's theory consists of three motivational factors: *a need for achievement, a need for affiliation, and a need for power* (Rohs & Anderson, 2001). Youth enjoy being part of a group and desire positive feedback when successfully completing tasks, large or small (Brennan et al., 2007). The need for achievement can be met through the goals that members accomplish. By joining 4-H, youth have the opportunity to associate with a group of individuals with similar interests, thus fulfilling their need for affiliation. As cited in Dworkin, Larson, & Hansen, (2003, p. 18), Brown (1990) stated that, "When a teen joins a team, club, or activity group, other members often become part of that teen's peer friendship network." Leadership roles such as committee chair, mentoring a younger 4-H member, teen leader, club officer, or being a member of the state council are offered to members and assist in meeting the need for power.

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Purpose and Objectives

The purpose of this study was to obtain a rich description of the factors that affect Pennsylvaniateen 4-H member involvement within the 4-H program. To serve as a foundation for future retention initiatives, 4-H extension educators and adult volunteers need to know the factors that influence and encourage older 4-H members to remain engaged. To that end, the following objectives were established:

1. Identify 4-H experiences that have made a large impact on a member's life
2. Identify the opportunities to plan 4-H events/activities that are provided to 4-H members
3. Determine factors that would encourage increased participation within the 4-H program

Methods and Procedures

As part of a larger study, general qualitative research methods were utilized to provide rich data in relation to the 4-H members' personal accounts of experiences within 4-H. In this study, data collection occurred via content analysis of the narratives written by 4-H members in

response to three apriori open ended questions located at the end of a researcher developed questionnaire; 1) Describe your most memorable 4-H experience.; 2) Explain a time when you helped plan a 4-H event.; and 3) Describe what would motivate/influence you to participate more often in 4-H events/activities beyond the club level. The researcher analyzed the data using the constant comparative method described by Glaser and Strauss (1967) that employed unitizing and categorizing of the data. The constant comparative method allowed the researcher to repeatedly compare the responses with previous responses in an attempt to discover new relationships (Dye, Schatz, Rosenberg, & Coleman, 2000). Following unitizing, the data was coded. These codes are included in the results in parenthesis after the quotations, as part of the trustworthiness criteria of confirmability (Erlandson et al., 1993). The results of the content analysis are only relevant to the participants of the study.

The apriori open ended questions that were analyzed, served as the categories of data. The categories of data were then sorted into emergent themes and theme titles were developed to distinguish each theme from the others (Erlandson et al., 1993). Continual revision, modification, and amendment were used until all data were classified into an appropriate theme. Two professionals familiar with 4-H and youth development served as coders reviewing the researcher's themes and suggesting revisions. Negative case analysis was performed allowing for alternative interpretations of the data (Erlandson et al.). Following the negative case analysis, the researcher bridged the data, linking emergent themes that included similar content. These techniques established trustworthiness of the data collected. Triangulation of the quantitative data from the larger study was utilized to add richness to the results.

Results

In the context of 4-H participation, youth were presented with questions inquiring about programmatic opportunities. The questions were developed based on previous research and were designed to provide a richer account of members' experiences. Three apriori open ended questions served as the categories for data classification; 1) most memorable 4-H experience, 2) opportunities to plan 4-H events, and 3) factors that would encourage increased participation.

Most Memorable 4-H Experience

The 4-H program offers members numerous events/activities at the club, county, regional, and state levels. The most memorable 4-H experiences category was designed to describe activities or events that have made a large impact on 4-H members' lives. Following the content analysis of the responses (n = 78), five different themes emerged: events (n = 31), fairs and shows (n = 23), friends and meeting new people (n = 18), recognition (n = 17) and club activities (n = 12) (see Table 1).

Table 1. Most Memorable 4-H Experience Emergent Themes

Theme	n
Events	31
Fairs and Shows	23

Friends and Meeting New People	18	
Recognition	17	
Club Activities		12

Many fairs and shows signify the completion of 4-H projects that members have spent countless hours preparing or creating for several months. Recognition serves as a great retention tool for the 4-H (see Figure 2) providing youth with opportunities to meet their needs for achievement as outlined by McClelland (1987). Members mentioned that "…it was fun doing the projects and getting rewarded" (m.134). An example of this recognition is "…the state horse show when [the individual] was awarded the outstanding 4-H horse member award trunk at the awards ceremony" (m.106).

Involvement in fairs and shows provide an avenue for 4-H members to develop strong friendships while working together with other 4-H members to achieve a common task or goal. In regards to McClelland's motivational needs theory (1987), relationships within the club or organization can assist in fulfilling a person's need for affiliation (see Figure 2). Participating in club events allows 4-H members to stay connected to a familiar group and establish friendships close to home. In addition to club events, 4-H offers members numerous opportunities to participate in activities/events at the county, regional, and state levels. Attending events/activities, above the club level, is a great way for 4-H members to interact with individuals from other parts of the county, region, and state and develop life skills that will benefit them in the future . Members mentioned that serving as a "…camp counselor has been a great deal of fun..." and "…lifelong friends were made through [being a camp counselor]." Through the experience of being a camp counselor it was mentioned that "…responsibility and leadership skills were learned that wouldn't have been learned otherwise" (m.161). Not only do the members have the opportunity to interact with youth from other parts of the county, region, and state, but they can also develop many new friendships through those interactions. One student's most memorable moment was when he/she "…took a trip out to WI for the [subject specific] program; [He/she] met other teens from all over the country…" (m.171). One other member mentioned that "When I went to 4-H camp and met a whole bunch of people…" (m.103), serves as their most memorable 4-H experience.

Some 4-H members (n = 23) described events such as the state 4-H horse show, county fairs, and state farm show as their most memorable 4-H experiences. Experiences such as "…when I got fourth place with my goat in the market show at Farm Show" (m.141) and "going to the 4-H state horse show…with my miniature horse in driving" (m.107), are held as most memorable moments.

The 4-H mission statement reads, "4-H empowers youth to reach their full potential working and learning in partnership with caring adults" (Pennsylvania4-H, n.d.). Fulfilling the mission statement of the 4-H program requires 4-H to offer quality opportunities for members to explore their interests and realize their full potential while interacting with adults and other 4-H members. State leadership conferences, 4-H camp, 4-H National Congress, regional retreats, and serving in leadership roles provide members with opportunities to improve their own skills and

recognize their strengths and weaknesses. One member mentioned that their "…most memorable 4-H experience would have to be what happened this year at 4-H State Achievement days. It was not only fun, but I also learned a lot. I learned a lot about how to give a presentation from preparing for it, and I gained a lot of skills in presenting" (m.128). By recognizing their strengths and weaknesses, 4-H members can then choose activities that will utilize their strengths and manage their weaknesses. For example one member mentioned, "After I returned [from an exchange trip] I gave several speeches to organizations that aided me with donations and I got more comfortable with public speaking" (m.171).

With over 90,000 4-H members on the Pennsylvania4-H roster in 2007 (Pennsylvania 4-H, 2007), 4-H can serve as an outlet for youth to meet many new people and make many new friendships that can last a lifetime. One member mentioned that "[Regional Camp] was so much fun and I got to hang out with friends and got to know other people" (m.153). Numerous individuals mentioned that they will always remember the friendships they made and the people they have met through 4-H, for example, "My most memorable 4-H experience was going to National Congress. It was nice to meet new people from around the United States" (m.160).

Club activities possess some of the highest participation rates of any 4-H events/activities and can affect youth involvement . Several 4-H members shared their memories of being involved in club activities such as "Doing a [subject specific] workshop for the public with my entomology club. It [the workshop] was a lot of fun and we got to teach the public about insects" (m.143) and "When my club went to do a community service project at an older home" (m.114) as their most memorable 4-H experiences.

Opportunities to Plan 4-H Events

Pennsylvania4-H members are given the opportunity to be involved in the planning process of the clubs often . According to Hensley et al. (2007), allowing youth to have a role in the decision making process, increases a youth's sense of belonging and allows the youth to take ownership in 4-H. Previous research has stated, teens that choose to participate in youth organizations, are guided by caring adults who are giving teens the opportunities to be a major part of the decision making process (Heinsohn & Lewis, 1995). Scales and Leffert (1999, p. 53) reported that youth who have opportunities to make decisions develop an "…understanding that they are accountable to themselves, their families, and their communities."

Seventy seven responses were analyzed in relation to the question, explain a time when they helped plan a 4-H event. Through the analysis of the responses, four common themes emerged: planning club activities (n = 40), planning county 4-H events (n = 22), planning regional 4-H events (n = 9) and never planned an event (n = 5) (see Table 2). Through a members' role as a club officer they are given the opportunity to plan 4-H events/activities often . The opportunities to plan 4-H events category was included in the study to discover specific events and activities that 4-H leaders and extension educators feel comfortable allowing the 4-H members to plan. By knowing this information, 4-H leaders and extension educators can evaluate their clubs and determine whether the 4-H members, in their respective clubs, are given enough opportunities to feel as though they are an integral part of the club organizational structure.

Table 2. Opportunities to Plan 4-H Events Emergent Themes

Theme	n
Planning Club Activities	40
Planning County 4-H Events	22
Planning Regional 4-H Events	9
Never Planned an Event	5

Forty 4-H members stated that they had the opportunity to plan club activities such as: shows, banquets, meetings, picnics, trips, officer trainings, and game nights. For example, "[A 4-H member] was chair of the recognition banquet committee for the club. [They] planned what food [they] were going to have and helped organize and acquire the materials to put on the dinner" (m.117). In addition to banquets, 4-H members also were given the opportunity to "…plan and present a 4-H [subject specific] Day Camp. [The 4-H member] planned the whole lesson and with the help of [their] extension agent [the 4-H member] planned the location" (m.155).

The 4-H program extends far beyond the individual specialized clubs in the communities which the members may live. Thirty one 4-H members stated that they take full advantage of the opportunities provided beyond the club, volunteering to assist in the planning process of county and regional 4-H events. Involvement in teen councils allowed 4-H members the opportunity to "…plan the county achievement night, including the program, awards, and entertainment" (m.185) and one 4-H member even "…helped put together a teen group in [their county]. [Putting together the teen group] required calling all the teens in the county, inviting them to a meeting, giving them an incentive to come and pushing my friends to come and increase the population" (m.147). Planning involvement does not stop at the county level, attending camp counselor training allowed one member "…to help plan [Camp] - the theme, daily themes, etc" (m.116), also "…being a counselor, [the 4-H member] had a part in planning the [Regional Camp]" (m.185) and "…round-up events" (m.108).

Factors that Would Encourage Increased Participation

The factors that would encourage increased participation category allowed the researchers to discover the limitations 4-H members experience as well as what would increase the desirability of the events/activities. When asked to describe what would encourage them to participate more often in 4-H events/activities at the county, regional and state levels, 66 responses were analyzed resulting in three common themes: friends and the opportunity to meet new people (n = 22), more available resources (i.e. money, time, and transportation) (n = 17) and more information provided on the events (n = 8) (see Table 3).

Table 3. Factors that Would Encourage Increased Participation Emergent Themes

Theme	n
Friends and the Opportunity to Meet New People	22
More Available Resources	17
More Information Provided on the Events	8

Individuals have mentioned that they would be more involved in activities and events if more of their friends would be involved. The more friends they have within the 4-H will assist in encouraging members to participate in events and activities beyond the club level, because the members would have a chance to spend time with their friends (see Figure 2). Friends and meeting new people was identified as a major influence that would encourage more participation in county, regional, and state events/activities. One member mentioned that "I would be more motivated to participate in 4-H activities if more people in my county did 4-H. Hardly any of my friends are in 4-H and I would have more fun if they were" (m.117).

Through participating in the county, regional and state events/activities the 4-H members are meeting a larger number of people thus increasing their opportunities to create new friendships. One 4-H member mentioned, "What motivated me were my friends I made through 4-H. I know that unless I attended more 4-H functions I probably wouldn't have been able to see them" (m.161). According to Kress (2005), feeling a sense of belonging increases the chance of youth attaining positive outcomes. Additionally, having a sense of belonging may also encourage youth to stay enrolled in 4-H (Hensley et al., 2007)

Members mentioned that the lack of information (n = 17), relative to the activities that would take place at 4-H events, discourages their participation. A member stated that "Many times I would like to participate in more events of 4-H, but my leaders do not supply us with the information or encourage us to do it. My leaders have the attitude of doing just enough to show at the fair" (m.172) and another member mentioned that "If I could learn more about the activities provided, I would participate often" (m.143). Members joined 4-H to help develop public speaking and leadership skills. A few members mentioned that they were ill-informed about the potential for life skills building that particular 4-H events/activities may offer. It was stated that "What would help more is if someone representing the event and told/showed what is going to happen at it" (m.141).

Availability of resources, outside of those controlled by the 4-H program, hinders 4-H participation as well . These resources include; money, time, transportation, and family obligations. According to 4-H members, "The main thing that would probably get me to more events/activities at the county, regional, and state levels would be if the events cost less money or if there were more scholarships for our individual counties" (m.178). Furthermore, "finances limit things greatly for me, this is my last year in 4-H, but the first time I have been at SLC" (m.150), so "a smaller cost to attend some events…." (m.185) would encourage more participation. In addition to financial problems, "if I had more time I would attend more events…" (m.139) was also mentioned. Many members "…just don't have enough time to participate" (m.154) and therefore"… nothing else would make [them] come more" (m.146).

After reviewing the data for the three categories; most memorable 4-H experience, opportunities to plan 4-H events, and factors that would encourage increased participation, it is noted that friendships and meeting new people, club activities/events, and county activities/events were common themes across two of the three categories examined. Through these themes it can be acknowledged that there are specific aspects and/or events within 4-H that encourage more 4-H members to remain involved such as, "going to Penn State days and participating in Dairy Judging and meeting new people & making new friends" (m.137) or "…planning 4-H club meetings and making the final decision in what needs to be done and what we are going to discuss" (m.161). "[4-H members] help plan a bunch of events with county council…" (m.141). One 4-H member "…was in charge of Secretary workshop…" (m.141) at the county officer training workshop and the 4-H member "…made a puzzle and showed a slide show…" (m.141). According to the 4-H member the workshop "…turned out great" (m.141). Some 4-H members remember that "…club meetings…were some of the greatest times [they] ever had. Meeting with all [their] friends was amazing. [Their] leaders helped [them] with everything. Some of the people they saw there, [they] only saw at the meetings so it was always fun. Some of [their] best friends [they] met at those meetings" (m124).

Implications and Recommendations

Teenage youth need to feel like an integral part of program administration (Brennan et al., 2007; Larson, 2000; Lauver & Little, 2005). 4-H educators and leaders should continue to allow members to assist in program facilitation and add new opportunities for planning, leading, and facilitating activities/events (Hensley et al. 2007). Through the experience of planning events and leading others, 4-H members can fine tune their time management and organizational skills . In turn, these skills will assist members in their future. Furthermore, recruitment/retention guides outlining techniques of recruitment/retention should be created and distributed to Pennsylvania4-H extension educators and 4-H leaders. The recruitment/retention guides should demonstrate methods of incorporating members into the decision making processes. The guides should provide the resources (worksheets, pamphlets, activity/event descriptions, etc.) required for the extension educators and 4-H leaders to inform youth and parents of the benefits of 4-H membership.

Many 4-H members find it difficult to participate in the numerous opportunities that are presented to them as they age and transition from middle school to high school (Weiss, Little, & Bouffard, 2005). One way to compete with other activities is to ensure that all 4-H activities and events are age appropriate and present some level of challenge . Leaders and extension educators should evaluate programs and be sure to incorporate events/activities that are age appropriate and appealing. The teens involved in 4-H programming should be included in the evaluation of the programs (Acosta & Holt, 1991; Harder et al., 2005; Hensley et al., 2007; Lauver & Little, 2005).

Lack of sufficient information about 4-H activities limits a member's participation. The allocation of funds to produce informational materials focused on particular activities would allow 4-H members to be better informed about happenings beyond the club level . If the 4-H members do not view the activity/event as beneficial in building life skills then they are less likely to attend. In addition to the informational materials, former attendees (Lauver & Little,

2005) of the activities/events should travel to 4-H club meetings, informing members of how they benefited through their attendance.

The cost of participating in 4-H events/activities limits some 4-H members' ability to be involved (Brennan et al., 2007). By offering more opportunities for 4-H members to earn/win registration fees for events would encourage not only participation in events, but also increased participation in club activities. Extension educators and 4-H leaders should seek funding from outside sources to assist in providing funding for registration fees.

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Discussant remarks for: **A Content Analysis of Teen 4-H Member Responses in Relation to the Factors that Affect Their Involvement in Pennsylvania4-H Programming**

Prepared by: John Rayfield, Assistant Professor, Texas A&M

The author(s) are to be commended for investigating factors that affect involvement in 4-H programming. This line of inquiry is necessary in many of our youth organizations and is often times overlooked or ignored. The author(s) do a nice job of forming a theoretical base for the study and the use of McClelland's Motivational Needs Theory is most appropriate for this study.

The methods seem to be in order for this qualitative study to provide a rich description of the experiences 4-H members report as valuable. Are there more current data analysis protocols than Glaser &Strauss (1967)? As I move to results, I like the way the researchers categorized responses, but left this section a bit confused. Aren't all items listed in Table 1 4-H events? Could a more specific breakdown of the responses yield more descriptive data? I'm confusing by the quantitative nature of your tables.

As I move to Table 2 I have the same concerns. Why try to quantify responses? These activities are all planning activities. I am familiar with the different levels on which we plan in 4-H, but planning is planning. I do commend the author(s) on a thorough and rich description of events; however the planning of events section lacks the depth of the previous theme.

Table 3 provides the same challenges. Why not separate friends or friendship and the opportunity to meet new people. In my estimation, these are two different themes. The implications and recommendations section of this manuscript could be substantially improved. So what does this mean for the 4-H agent? 4-H specialist? 4-H volunteer? What do these findings tell extension administrators and program development specialist? What are the implications for these groups?

I commend the author(s) for tackling such a practical and pertinent issue in extension education and programming. This paper is an easy read that is basically well written. There are a few spacing issues with periods toward the end of the manuscript. Thank you for adding to the body of knowledge in 4-H programming literature.

Adults' Level of Teaching Efficacy and Demographic Characteristics as Volunteer Educators for Their Local Cooperative Extension Master Gardener Program

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Abstract

Cooperative Extension needs a consistent corps of volunteers to deliver organizational objectives. Extension agents should develop an understanding of volunteer motivations in order to identify and retain those individuals. The theoretical framework of this study was based on self-efficacy theory. The purpose of this study was to develop an understanding of the teaching self-efficacy of Master Gardeners. The questionnaire included the instructional efficacy construct from the Teacher Sense of Efficacy Scale (TSES) and questions about participant demographics. The response rate was 74%. The majority of participants were mainly women, white, earned some type of higher education degree, and nearly half of the participants were 56 years old or older. Adults felt "Some Influence" in their effective teaching duty as a volunteer educator in the Master Gardener Program. Retaining quality Master Gardeners may increase the effectiveness of Cooperative Extension.

Introduction

Volunteers are individuals searching for information while cooperating with individuals or organizations with mutual interests (Rost, 1997). Kirsch and VanDerZanden (2002) suggested researchers develop an understanding of the characteristics of Master Gardener volunteers on a state by state basis due to the lack of a standard national program. Extension should utilize trained Master Gardeners in as many volunteer opportunities as possible for several years in order to receive a good return on their investment (Meyer & Hanchek, 1997; Swackhamer & Kiernan, 2005). An adult who is secure and self-confident with the volunteer responsibility is more likely to remain involved in the Master Gardener Program (Swackhamer & Kiernan).

The mission of the Tennessee Master Gardener program is to educate participants as volunteer educators of The University of [State] Extension and the [State] State Cooperative Extension Program by providing home gardeners with researched-based knowledge (Reiners, Nichnadowicz, Nitzsche, & Bachelder, 1991). In [State], there are approximately 2,000 active adult Master Gardeners that serve 46 of the state's 95 counties. Once their education is finished, adults are required to donate 25 volunteer hours annually to remain certified as a [State] Master Gardener. Master Gardeners' volunteer time provides them experiences and opportunities to interact with others through their teaching experiences (Flagler, 1992). Master Gardener participants are typically older white women (Meyer, 2004; Rohs, Stribling, & Westerfield, 2002; Sutton, 2006). However, little research exists as to their level of education, income, and length of tenure in the program. Research is needed on Master Gardener's instructional efficacy due to a deficiency on the topic. This study attempts to alleviate a portion of this deficiency.

A need exists for volunteers throughout Cooperative Extension. Hoover and Connor (2001) indicated volunteers are significant components of each Extension program area. Master Gardener volunteers stretch the reach of Cooperative Extension (Swackhamer & Kiernan, 2005). As Extension programs at land grant institutions throughout the nation have continued to face budget deficits and decreased funding, the role of the Extension volunteer has become increasingly more significant for the organization to provide reliable services to the general public (Steele, 1994). A continuous stream of volunteers is essential to the operation of Extension objectives (Smith, 2005). Stouse and Marr (1992) suggested that Master Gardener volunteers serve as walking advertisements for the program.

Training volunteers accurately, and providing the right type of experiences for volunteers, may allow adults to feel motivated to carry on with their volunteer service (Corporation for National and Community Service, 2006). An agent must have an understanding of what appeals to and motivates volunteers in order to effectively recruit, train, and retain these volunteers (Boyd, 2004). National statistics have revealed that, on the average, one out of three volunteers discontinue volunteering after one year of service (Corporation for National and Community Service, 2006). Boyd recommended staff members and administrative personnel must be aware of the factors that contribute to successful volunteer commitment and adapt their management strategies to align with these factors in order to better recruit, prepare, and retain these adults.

Theoretical Framework

The theoretical framework of this study was based on self-efficacy theory (Bandura, 1993). Self-efficacy theory is the extent beliefs regarding the capacity to control the performance and incidents that influence their lives (Bandura, 1993). The affect of self-efficacy contributes to an adult's motivation to participate in an activity. Self-efficacy will impact how adults cogitate, form opinions, inspire themselves, and act (Bandura, 1997). Tschannen-Moran and Woolfolk Hoy (2001) suggested educator self-efficacy describes an instructor's confidence in his/her aptitude to bring about learner engagement and learning outcomes including difficult learners.

Adults confident in their abilities address complex undertakings as opportunities to be successful (Bandura, 1997). Success encourages their interest and engages individuals in endeavors. High self-efficacy adults establish lofty goals and sustain a robust obligation to those goals. Also, these individuals devote enhanced efforts in their duties and improve their efforts in the appearance of letdowns. High self-efficacy individuals consider advantages by continuing to be task oriented in times of trials, and accredit letdowns to inadequate efforts. High self-efficacy individuals are success oriented and thus promptly recuperate their feeling of efficacy after letdowns (Bandura, 1993). These individuals address perils believing they can manage them. These attributes of self-efficacy operationally contribute to individual accomplishments.

Master Gardeners utilize their knowledge and skills to teach clientele (Peronto & Murphy, 2009; Rohs & Westerfield, 1996). Knobloch and Whittington (2002) found collective efficacy was theoretically and operationally similar to teacher efficacy. Teaching in a setting similar to what students would encounter professionally improved their teaching efficacy (Knobloch, 2001). Self-efficacy was the influential variable that characterized individuals who

succeeded as a secondary agricultural education teachers (Kelsey, 2007). Student teachers felt more efficacious about their teaching efficacy after their opportunity to student teach (Knoblach, 2002; Roberts, Harlin, & Ricketts, 2006; Stripling, Ricketts, Roberts, & Harlin, 2008). If preservice teachers are better educators after their teaching efficacy is improved, then Master Gardeners may remain active and be more proficient and effective in their roles as volunteer educators if they possess high self-efficacy in teaching.

Purpose and Objectives of the Study

The purpose of this study was to develop an understanding of the teaching self-efficacy of Master Gardeners. The primary objectives of the study were to:

1. Describe participant demographics in the Master Gardener Program.

2. Describe Master Gardeners' efficacy in instructional strategies as volunteer educators.

Methodology

The findings are part of a larger study conducted to develop an understanding of factors related to the enrollment and retention of Master Gardeners. It was a descriptive study using a census of participants from one county's Master Gardener Program in Tennessee. The portion of the study reported here focused on the teaching self-efficacy of Master Gardeners. Quantitative research was selected as the research design for this study. Eighty-nine adults served as volunteer educators for the local Master Gardener Program.

Survey research employs questionnaires to gather data from the population. Ary, Jacobs, Razavieh, and Sorenson (2006) explained survey research allows the researcher to condense the results of characteristics of dissimilar groups in order to assess their attitudes and opinions. The questionnaire included the instructional efficacy construct from Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES) and questions about participant demographics. The TSES was derived from Bandura's (1993) self-efficacy theory. On the instructional efficacy construct of the TSES, respondents were asked "How much can you do?" with a scale of: 9 = *a great deal*, 7 = *quite a bit*, 5 = *some influence*, 3 = *very little*, and 1 = *nothing*. Reliability for the instructional efficacy construct of the Teacher Sense of Efficacy Scale was calculated ex post facto at .94.

The researchers utilized the methods outlined by Dillman, Smyth, and Christian (2009) to increase response rate from participants when instituting a mail questionnaire. The data collection instrument was printed in a booklet layout and then mailed to the sampled population. Eighty-nine participants were surveyed and 66 participants returned their completed surveys to the researchers. Thus, the response rate was 74%. Early and late respondents were compared and no significant differences existed, therefore the results may be generalized to the target population (Lindner, Murphy, & Briers, 2001).

Women accounted for 83% of the respondents, and all but one respondent was white. Forty-six percent of participants were 56 years of age or older. Also, 74% of participants had

obtained at least an Associate's Degree. Participants' annual income tended to be between $25,000 - 49,999 Over 58% of respondents had participated in the program over 2 years.

Descriptive statistics were selected to analyze the study's objectives. Descriptive statistics determine attributes of different groups in order to measure their attitudes toward a specific item (Shavelson, 1996). A limitation of the study is the selection of Master Gardener adult participants in Putnam County, Tennessee. The target population may not be characteristic of other adult Master Gardeners or Master Gardener programs in other states. This limits the ability to generalize the findings of the study.

Findings

The objective of the study reported here was to describe Master Gardeners' efficacy in instructional strategies as volunteer educators. Table 1 illustrates the descriptive statistics for the instructional efficacy construct. The highest mean occurred for the question, "How much can you do to adjust your information to the proper level for individual clients?" (M = 6.18, SD = 2.05). The lowest mean was associated with the question, "How much can you gauge client comprehension of what you have taught?" (M =5.59, SD = 2.00).

Table 1
Descriptive Statistics for the Instructional Efficacy Construct

	N	*M*	*SD*
How much can you do to adjust your information to the proper level for individual clients?	66	6.18	2.05
To what extent can you provide an alternative explanation or example when clients are confused?	66	6.06	1.95
How well can you implement alternative strategies in your teaching?	66	5.92	2.08
How well can you respond to difficult questions from your clients?	66	5.73	1.87
How comfortable are you using evaluation strategies?	66	5.73	2.16
To what extent can you craft good questions for your clients?	66	5.64	1.93
How much can you gauge client comprehension of what you have taught?	66	5.59	2.00

Note: Overall M = 5.84, SD = 1.72. Scale: 9 = a great deal, 7 = *quite a bit*, 5 = *some influence*, 3 = *very little*, and 1 = *nothing.*

Conclusions and Implications

The majority of participants in this local Tennessee Master Gardener Program were mainly women, white, had earned some type of higher education degree, earned between $25,000 and $49,999 annually, and had been involved in the program slightly over three years. Almost half of the participants were 56 years old or older. The participants' characteristics in this study were similar to other studies involving Master Gardener characteristics (Meyer, 2004; Rohs, Stribling, & Westerfield, 2002; Sutton, 2006). Most participants indicated they had "Some Influence" over their instructional self-efficacy as volunteer educators in the Master Gardener Program.

Master Gardeners can serve as a vital resource for Extension to fulfill its mission as the educational outreach component of the land-grant university. Retaining high quality Master Gardeners can assist Extension in increasing organizational effectiveness and reducing the cost of the program (Schrock, Meyer, Ascher, & Synder, 2000). The Corporation for National and Community Service (2006) suggested preparing volunteers correctly, and offering a realistic variety of events, may motivate adults to continue with their volunteer service. In order to accurately and efficiently recruit, educate, and retain this asset, Boyd (2004) recommended Extension agents should develop an understanding of the aspects that encourages volunteers to participate.

The respondents in this study were homogenous. Cooperative Extension should strive to identify, recruit, and train a more ethnically diverse group of adults as volunteer educators for the Master Gardener Program. However, it is unrealistic for the county program included in this study to accomplish this due to the vast majority of the local population being white. Other local demographic factors should be considered as well such as age, education, and income.

Self-efficacy plays a role s in an individual's motivation to participate in activities. Bandura (1993) defined adults with high self-efficacy as performance oriented and recover self-efficacy quickly after disappointments. Participants in this study had a moderate level of instructional efficacy. Therefore, opportunities exist for Master Gardeners' instructional efficacy to be enhanced or decreased. This would address Bandura's recommendation to improve participants' cognitive and affective efficacy. Tschannen-Moran and Woolfolk Hoy (2001) suggested individuals are motivated to be successful in their experiences when instructional efficacy is high, and individuals become frustrated and seek other opportunities when instructional efficacy is low. An objective of the local Master Gardener Coordinator should be to enhance this group of Master Gardeners' current level of instructional efficacy. An adult who has efficacy with his/her volunteer duties is more likely to continue his/her participation in the Master Gardener Program (Swackhamer & Kiernan, 2005). The average tenure for adults in the program was slightly over three years. The group might have more efficacy in instructional strategies if they had been Master Gardeners longer. Conversely, instructional efficacy could be lower if their experience was less than three years.

Teacher self-efficacy is an educator's belief in his/her capability to manufacture student engagement and student outcomes (Tschannen-Moran & Woolfolk Hoy, 2001). Bandura (1997) suggested success give confidence to high self-efficacy adults in creating advanced objectives and the ability to sustain a vigorous commitment to objectives. The linkage between these two studies is the features of individuals with high teaching self-efficacy seek challenging objectives

and are committed to achieving those objectives. Bandura refers to this as motivational efficacy. Adults with low motivational efficacy may terminate their participation in the endeavor (Bandura).

Instructional efficacy is important for Master Gardener participation due to Cooperative Extension's need for volunteers and specifically those that can serve as effective volunteer educators for their local MG Program. Participants in this study possessed average instructional efficacy and thus it is unlikely they would have a robust obligation to the goals of the program (Tschannen-Moran & Woolfolk Hoy, 2001). Relf and McDaniel (1994) suggested the objectives of MG are to allow adult volunteers to support Cooperative Extension in teaching research-based horticultural information to local citizens. Cooperative Extension should be concerned if Master Gardeners have average or low self-efficacy due to the probability of less effective instruction to clientele and the likelihood those Master Gardeners will discontinue their participation.

Recommendations

More comprehensive research on Master Gardener participation is needed. A larger study of Master Gardener participants would help determine if specific demographic characteristics dictate which individuals possess more instructional efficacy than others. According to Schrock (1999), demographic characteristics alone cannot be used to predict prolonged participation in the Master Gardener program. More rigorous research is needed to learn why adults continuously participate in the Master Gardener Program.

In order to increase participants' teaching efficacy, local Master Gardener Coordinators should provide more time training their Master Gardeners how to educate their clientele. A professional development program targeted to Master Gardeners in the area of instructional teaching and learning strategies may lead to enhanced teaching efficacy of participants. Master Gardeners that have a high sense of teaching efficacy could serve as mentors for adults just beginning their involvement in the program or to assist those with low teaching efficacy. This approach may assist Cooperative Extension in retaining effective Master Gardener volunteer educators.

Preservice agriculture teachers viewed themselves as having the highest efficacy in instructional practices after their student teaching experience (Roberts et al., 2006; Stripling et al., 2008). Master Gardener Coordinators could provide initial teaching experiences for Master Gardeners in order to enhance their instructional efficacy prior to teaching clientele solely on their own. These initial teaching experiences could be monitored by their mentor, someone else determined to have high teaching efficacy, or the Master Gardener Coordinator. Opportunities for adults to teach clientele while beginning their Master Gardener involvement could improve their teaching efficacy over the long-term. Also, these experiences could identify which adults already feel efficacious in their teaching and thus assist the Master Gardener Coordinator in assessing new Master Gardener participants' instructional efficacy.

Opportunities to "practice teaching" may be a method to enhanced instructional efficacy. Knoblach (2002) reported teachers may have felt efficacious in their teaching and their student teaching experiences confirmed their beliefs. Research is needed to identify opportunities in

Master Gardener programs that are implemented in order to enhance participants' instructional efficacy. Future research should determine the advantages of those field experiences.

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Discussant remarks for: **Adults' Level of Teaching Efficacy and Demographic Characteristics as Volunteer Educators for Their Local Cooperative Extension Master Gardener Program**

Prepared by: John Rayfield, Assistant Professor, Texas A&M

The author(s) are to be commended for a worthy line of inquiry in extension education and programming. A strong theoretical framework is used to build the case for this study. Bandura's self-efficacy theory is very appropriate in this setting. The purpose and objectives in the study are clear. Some in our profession argue that describing participant's demographic characteristics is not a research objective; it is a mere description of your subjects. I would revisit this concept prior to journal submission.

The methods section of the paper seems to be in order. I have a question about the scale used to collect data. When does 1= nothing? This could be a bit confusing. I would also prefer to see pre-study reliability analysis on the instrument. The comparison of early to late responders probably was not necessary with the 74% initial response rate.

The findings are clear and easy to follow. The findings are quite simplistic and offer little variation, is this another limitation of the study? Nice job of including conclusions, recommendations, and implications that will inform practice in extension. One connection that is hard for the discussant to make is the relationship between master gardeners and pre-service teachers. For me, this is stretch to connect these studies in one body of knowledge.

Overall this is a well written manuscript that flows well and is easy to read. Congratulations to the author(s) on tackling a very practical but necessary research problem in our profession.

A Comparison of Perceived Knowledge Levels for Participants of Agricultural Communications Workshops

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The agriculture industry and colleges of agriculture are facing a similar challenge that is rooted in a declining rural youth population. This challenge manifests into a problem of a diminishing pool of applicants with agriculture backgrounds for employment and educational opportunities respectively. To address this challenge, universities have sought to increase enrollment by urban and ethnic minority populations. Workshops were designed and delivered in the summers of 2007 and 2008 to introduce urban, minority students enrolled in local science programs to agriculture through agricultural communications. Participants were provided introductory instruction in risk/crisis communication, news writing, video, photography, and Web design. The study utilized a post-then-pre-workshop assessment of perceived knowledge gain for agricultural communications workshops. Researchers found that participants' knowledge levels increased in a consistent manner as a result of the experience. This increase could lead to changes in urban, minority student awareness of and attitudes about agriculture. The results illustrated that even a limited term educational experience in agricultural

communications can have a positive effect on a non-rural student's understanding of the industry and potential enrollment to colleges of agriculture.

Introduction

Colleges of agriculture (COAs) are experiencing declining enrollments (Bobbit, 2006) while the industry of agriculture is facing a shortage of qualified workers (Goecker, Gilmore, Smith, E., & Smith, P.G., 2005). For agriculture, the challenge creates a potential negative outlook for the industry as graduates from colleges of agriculture and natural resources comprise a significant portion of the future workforce.

Changing patterns in the U. S. youth population that represents the traditional COA recruitment base highlight a nation that is increasing in minority population and is less rural. As such, COAs are examining ways to increase enrollment through the recruitment of urban, minority students. On the surface, the potential success for this strategy is high as the minority populations in Texas and California already make up more than 50% of the total populations in those respective states (Caldwell, 2005; Petersen & Assanie, 2005). Further, the nation's urban population as a portion of the entire population increased from 64.2% in 1950 to 77.2% in 2000 (Department of Economics and Social Affairs Population Division, 2002).

Sixteen years ago, Russell (1993) suggested that COAs target recruiting efforts toward students in secondary agriculture programs so that the students who are being recruited are already being shown agriculture in a positive light. More recently, Esters (2007) suggested that urban secondary agriculture programs could help meet the needs of increasing diversity in agriculture while bringing in students who are seeing agriculture in a positive light.

Until these secondary agriculture programs can become more widespread throughout U.S. urban high schools, other avenues of recruiting underrepresented students should be explored. Williams (2007) recommended "opportunities should be explored that might increase numbers of students who are female, from ethnic minorities, non-traditional age groups, and who are from out-of-state," (p. 110) and that current programs be improved and new programs be developed that increase awareness for the variety of careers available in agriculture.

One alternative avenue that has been explored is student workshops on agriculture-related topics. Published research efforts have shown that workshops in biotechnology and agriculture could have sustained effects when taught by faculty with expertise (Fritz, Ward, Byrne, Namuth, & Egger, 2005; Wiley, Bowen, Bowen, & Heinsohn, 1997). This limited amount of previous student workshop research leaves the unanswered question of the ability of an agricultural communications workshop to influence urban, minority science students to consider careers in agriculture.

Related Literature

Swanson (1972) contended that education affects knowledge, which affects attitudes, which affects behavior. Wiley et al. (1997) recommended that COAs use Swanson's theory when developing workshops that are trying to change minority students' attitudes toward agriculture. Wiley et al. also found that an agricultural and food science workshop's participants experienced

positive attitudinal gains that were still present a year later. Fritz et al. (2005) experienced similar results for a workshop about biotechnology, in terms of both positive attitudinal shift and sustained results for participants.

Benner and Marlow (1991) studied children's knowledge and desire to interact with other children who had cancer before and after receiving information about cancer. The researchers found that children who were given information about childhood cancer increased in their knowledge about cancer and in their desire to interact with a child who had cancer. What was of interest in particular was that students didn't show an increase in the initial post-intervention test from the pre-intervention test for their desire to interact with the child who had cancer. The children showed the increase in the final post-intervention test that occurred a week after the initial post-intervention test. The researchers suggested that participants may have needed time to fully digest the information. These results indicate that knowledge gained through a workshop experience could affect behavior and may not be immediate in its effects.

Frick, Birkenholz, Gardner, and Machtmes (1995) found that urban students were less knowledgeable about agriculture than their rural counterparts. The researchers also found that rural students' perceptions were similar to urban students in many of their perception scores. The researchers suggested that a more positive image of agriculture could be attained by increasing agricultural literacy of everyday people.

Wang and Netemeyer (2002) found that knowledge affects self-efficacy. Individuals with higher levels of self-efficacy are more likely to persevere through obstacles and are therefore more likely to be successful in their endeavors (Bednar & Petersen, 1995). Self-efficacy has also been shown to affect career interest (Degenhart, Wingenbach, Dooley, Lindner, & Mowen, 2006), which in turn affects attitude (Degenhart, Wingenbach, Mowen, Lindner, & Johnson, 2008). Atwater, Wiggins, and Gardner (1995) concluded that attitude affects career choice. In summary, a workshop experience has the ability to positively influence knowledge, self-efficacy, attitudes, and career interest and choice. As such, the literature suggests that a workshop experience may be an effective avenue in recruiting students into COA majors including agricultural communications.

Purposes and Objectives

This research falls into the National Research Agenda areas of Agricultural Communications for building "competitive societal knowledge and intellectual capabilities" (Osborne, n.d., p. 10) and Agricultural Education in University and Postsecondary Settings for recruiting and preparing "students for the future workforce in the agricultural and life sciences" (p. 16). The purpose of this study was to assess the perceived knowledge level of urban high school science students who participanted in agricultural communications-related summer workshops in 2007 and 2008. More specifically, the objectives of this study were to

1. Describe demographic characteristics of 2007 and 2008 workshop participants.
2. Describe participants' perceived pre- and post-workshop knowledge levels.
3. Compare 2007 and 2008 workshops in terms of knowledge level and increases as a result of the workshop.

4. Compare individual workshop locations in terms of knowledge level andincreases as a result of the workshops.

The purpose of the workshops was to introduce urban, minority science students to agriculture from a perspective not typically presented to the American populace: agricultural communications. Workshops were conducted at two single-state sites in the summer of 2007 and three sites in three states in the summer of 2008.

Methodology

The lessons conducted during each workshop were in the subject areas of risk/crisis communications, photography, video, Web design, and news writing. Efforts were made to maintain the same instructional schedule for each workshop. However, due to time constraints, the video and photography lessons were taught on the same day for 2008 workshops as opposed to separate days in 2007. As part of the workshop program, participants were also taken on industry-related tours that were in close proximity to their schools. The actual tours varied by workshop location. In addition to the communications-related tour, 2008 participants also went on agriculture-related tours.

This study utilized a post-then-pre-workshop assessment to collect data of perceived knowledge gain from the agricultural communications workshops. Participants indicated their knowledge level in the five lesson areas after the workshop for both their current and prior knowledge levels. A post-then-pre assessment was used because in the traditional pre-then-post assessment, participants might not be aware of what they do and do not actually know (Rockwell & Kohn, 1989), which could lead to a response shift bias because participants' reference points could change (Rohs, 1999).

Demographic data were analyzed for frequency information. Perceived knowledge data were analyzed by means. Means were compared between what participants believed their knowledge to be before the workshop and after the workshop. Perceived knowledge levels were also compared between 2007 and 2008 workshops.

For the purposes of reporting the results, the 2007 sites will be referred to by the numbers 1 and 2, and 2008 sites will be referred to by the letters A, B, and C. Site C differed from the other sites because its participants were enrolled in an agricultural magnet school, while the other workshops consisted of students from schools without formal agriculture programs in place. The researchers hope to gain knowledge of what value a content-specific workshop will have on students who are already involved in agriculture (Site C), as opposed to the rest of the workshops being taught to students without formal agricultural experiences.

Results

The resulting population ($N = 53$) for this study were the participants of the 2007 ($n = 29$) and 2008 ($n = 24$) workshops. In both years, the majority of the participants were female (2007 $n = 16$, 55.2%; 2008 $n = 19$, 79.2%) (Table 1). Hispanics were the most represented ethnic group for 2007 ($n = 25$, 86.2%) and 2008 ($n = 11$, 45.8%). While freshmen ($n = 16$, 55.2%) was the

most widely represented classification for the 2007 workshops, juniors (n = 12; 50%) was the most widely represented group for 2008.

Table 1

Characteristics of 2007 and 2008 Workshop Participants (N = 53)

	2007 (n = 29)		2008 (n = 24)	
	(f)	(%)	(f)	(%)
Gender				
Female	16	55.2	19	79.2
Male	13	44.8	5	20.8
Ethnicity				
Hispanic	25	86.2	11	45.8
African-American	2	6.9	9	37.5
White	1	3.4	3	12.5
Asian	1	3.4	0	0.0
Native American	0	0.0	1	4.2
Grade Classification				
Freshman	16	55.2	0	0.0

Sophomore	4	13.8	11	45.8
Junior	9	31.0	12	50.0
Senior	0	0.0	1	4.2

Note. Demographic data gathered from student applications for workshop

Students in the 2008 workshops indicated higher pre-workshop knowledge levels than 2007 participants in all lesson areas (Table 2). The highest pre-workshop levels were photography and news writing both years. For 2007, the average levels were 3.8 for photography and 3.4 for news writing. For 2008, the levels were 4.5 for photography and 4.4 for news writing. The lowest pre-workshop levels for both years were for the lesson areas of risk and crisis communications and Web design. For 2007, the levels were 2.8 for risk and crisis and 3.0 for Web design. For 2008, the levels were 3.4 for risk and crisis and 3.3 for Web design. Photography was indicated at the highest level for the 2007 post-workshop assessment at 6.3, with the video and risk and crisis lessons each being indicated at 6.2. Photography at 6.6 was also indicated as the highest level for the 2008 post-workshop indication, with the risk and crisis next at 6.4. Web design, at 5.6 for 2007 and 5.8 for 2008, was indicated as the lowest after the workshop for both years, and news writing was the next lowest at 5.9 for 2007 and 6.0 for 2008.

Table 2

Perceived Knowledge Level of Workshop Participants (N = 53)

	Risk/Crisis		Photography		Video		News Writing		Web Design	
	ɹe	ɔst	re	ost	re	ɔst	ɹe	ɔst	re	ɔst
2007 (*n* = 29)	.8	.2	.8	.3	.3	.2	.4	.9	.0	.6
1 (*n* = 16)	.1	.2	.9	.3	.8	.5	.6	.0	.7	.9
2 (*n* = 13)	.3	.2	.7	.3	.7	.8	.2	.7	.3	.2

2008 (n = 24)	.4	.4	.5	.6	.0	.2	.4	.0	.3	.8
A (n = 7)	.0	.3	.4	.3	.9	.9	.6	.0	.4	.9
B (n = 6)	.0	.5	.0	.5	.7	.2	.8	.2	.3	.8
C (n = 11)	.9	.4	.9	.4	.4	.9	.1	.3	.8	.3

Note. Answers ranged from 1 = "no knowledge" to 8 = "very knowledgeable"

Of the individual sites, Site C participants (agriculture magnet school) indicated having the highest pre-workshop knowledge level for all lesson areas except news writing. Site 2 participants indicated having the lowest pre-workshop knowledge level for all lesson areas except Web design. Site B participants had the highest self-perceived knowledge level for all lesson areas post-workshop. The highest post-workshop knowledge level for any individual lesson was photography at Site B (M = 7.5). The lowest post-workshop level was Web design for Site 2 (M = 5.2).

Participants from the 2007 workshops perceived more of a knowledge gain than participants from the 2008 workshops in all of the lesson areas (Figure 1). The disparity was greatest for the news writing, where 2007 differed from 2008 by 0.9, and video, where 2007 differed from 2008 by 0.7. Results were closest with the Web design lesson, which only differed by 0.1. The biggest gain for both years was for the risk and crisis lesson. News writing experienced the least increase for 2008, while news writing and photography equally experienced the least gains for 2007.

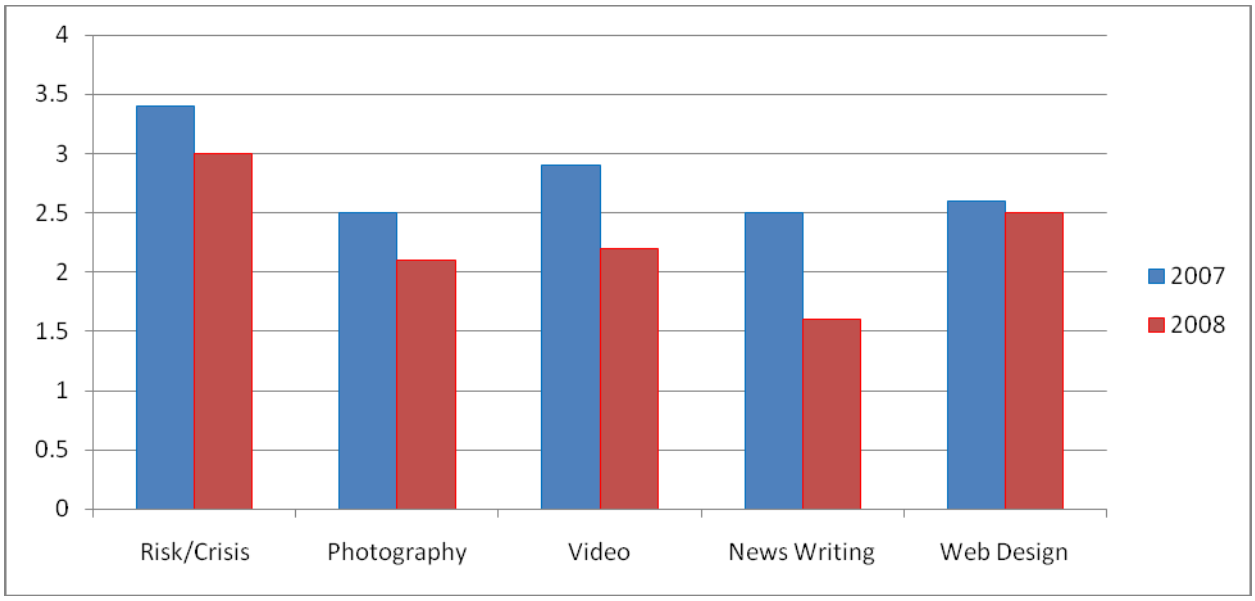

Figure 1. Perceived knowledge gain of workshop participants for each year of workshops.

For the individual sites, Site C (agriculture magnet school) increased the least for each lesson area (Figure 2). Site B increased the most in photography, video, and Web design. Site 2 increased the most for risk/crisis and news writing. News writing increased the least for four of the sites. Risk/crisis and Web design were the only lesson areas to be the biggest areas of increase for more than one site.

When examining the average of the participants perceived knowledge levels, the trend of higher increases for the 2007 workshops becomes more apparent (Table 3). The average increase in perceived knowledge was 0.4 higher in 2007 than in 2008, but the difference in the perceived post-workshop levels was not as pronounced. There was only a 0.2 difference in the average post-workshop perceived knowledge levels of the 2007 and 2008 workshops, compared to the 0.6 average difference in the pre-workshop perceived knowledge levels. Site C had the highest self-perceived pre-workshop knowledge level, while Site 2 had the lowest. Site B had the highest average post-workshop level of perceived knowledge, while Site 2 had the lowest level. Site B averaged the biggest increase, and Site C averaged the least increase.

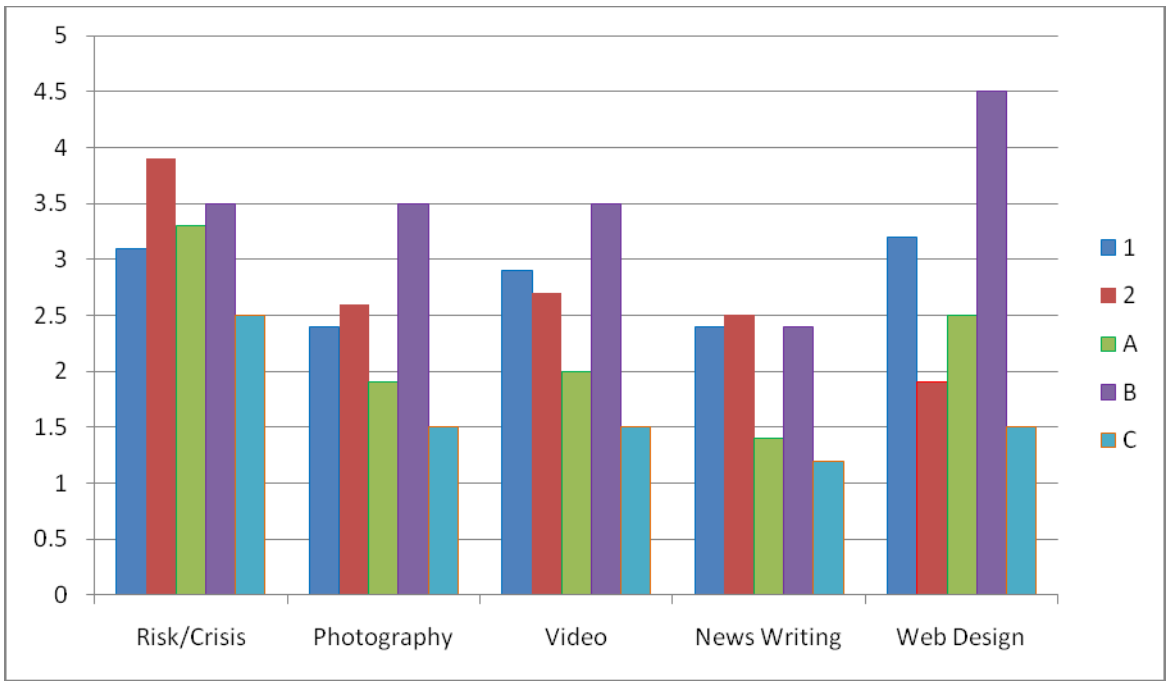

Figure 2. Perceived knowledge gain for individual workshop sites.

Table 3

Average Perceived Knowledge Levels of Participants (N = 53)

	pre	post	change
2007 (*n* = 29)	3.3	6.0	2.7
1 (*n* = 16)	3.4	6.2	2.8
2 (*n* = 13)	3.0	5.8	2.8
2008 (*n* = 24)	3.9	6.2	2.3
A (*n* = 7)	3.9	6.1	2.2

B (n = 6)	3.6	7.0	3.4
C (n = 11)	4.2	5.9	1.7

Note. Answers ranged from 1 = "no knowledge" to 8 = "very knowledgeable"

Conclusions

The 2007 workshops were more successful in terms of increase in perceived knowledge, but the 2008 workshops were more successful in terms of post-workshop level of perceived knowledge. Though the 2008 workshop participants indicated an average higher post-workshop knowledge level than 2007 participants, the disparity was less than the difference between the groups' perceived pre-workshop knowledge levels.

For the individual lesson areas, the risk and crisis lessons were the most effective at increasing perceived knowledge for both sets of workshops. Photography and news writing were the least effective lessons for increasing perceived knowledge for the 2007 workshops, while news writing was the least effective for 2008. In terms of post-workshop perceived knowledge, photography was the most effective lesson for both years, while Web design was the least effective for both years.

As for the individual workshops, Site B was the most effective at increasing perceived knowledge for the overall average of all lesson areas. Site C (agriculture magnet school) was the least effective at increasing perceived knowledge. Sites 1 and 2 were equal in effectiveness for the 2007 workshops. Site B was also the most effective in terms of post-workshop perceived knowledge level, while Site 2 was the least effective. Site 1 was the most effective for 2007 and Site C was the least effective for 2008. The perceived knowledge scores for Site C consistently improved the least as a result of the workshop, while Site B tended to improve the most.

Based on these conclusions, Site C's participants (agriculture magnet school) benefited the least from the workshops. Despite being unsuccessful in terms of post-workshop perceived knowledge and improvement when compared to the other workshop sites, the participants still indicated having a higher pre-workshop knowledge level than the rest of the sites. While lacking evidence through this study, the researchers contend that this is due to the agriculture instruction they received at their magnet school. If the results for Site C were not random but related to students' prior experience with agriculture, it would provide support for the Frick et al. (1995) recommendation on focusing teaching efforts on what the students do not know rather than assessing what they already know. Further, resources committed to future workshop efforts should be targeted only to those students without agriculture backgrounds (educational or experiential) to minimize potential duplication and to achieve the greatest potential return on investment.

With the possible exception of Site C, the results of this study are consistent with the previous results of Fritz et al. (2004) and Wiley et al. (1997). Participants' knowledge levels

increased in a consistent manner as a result of the experience, which could lead to changes in their awareness of (Wildman & Torres, 1999) and attitudes (Degenhart et al., 2006) about agriculture.

When examining the results, it seems important to know whether the 2007 lessons were more effective than the 2008 lessons because the average increase was more or if the 2007 and 2008 lessons were about equally effective because the post-workshop levels were similar. If it is the latter, it needs to be assessed whether or not the highest knowledge level that can be attained as a result of one-week workshops has been found in these workshops. If it is the former, it needs to be assessed which differences between the 2007 and 2008 workshops were the causal agent.

Either way, future workshop endeavors should be developed and improved until permanent secondary urban agriculture programs can be established. Based on the results from site C, secondary urban agriculture programs can give minority students a background in agriculture who will be more likely to complete a degree in agriculture (Dyer, Lacey, & Osborne, 1996). While these programs may be the desired goal, the potential for workshops to positively change the agriculture knowledge level of urban high school science students may serve as a starting point for these programs, for addressing COAs recruitment goals, and for meeting the workforce needs of the agriculture industry.

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A Comparison of Perceived Knowledge Levels for Participants of Agricultural Communications Workshops

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The authors of this study used a post-then-pre-workshop assessment to collect data on perceived knowledge gain of participants in a series of workshops designed to introduce urban, minority high school students to agriculture from the perspective of teaching them skills associated with careers in agricultural communications. The focus of the study was a comparison between workshops conducted in 2007 and 2008.

The literature review and theoretical framework utilize theory related to the influence of knowledge on attitude and behavior in the context of agricultural literacy workshops, as well as self efficacy. The related literature the authors draw on indicated that self efficacy can affect career interest, which in turn affects attitude, which then affects career choice. On this basis, they suggest that a workshop experience may be an effective way to recruit urban and minority students to agricultural college majors.

Results and conclusions of this study provided insights into levels of perceived knowledge of specific topics and in the comparison of workshops. The authors were able to conclude that the 2007 workshops were more successful in terms of increase in perceived knowledge, but the 2008 workshops were more successful in terms of post-workshop level of perceived knowledge. The contend that this may be due to a ceiling effect whereby the 2007 workshops might have achieved the highest knowledge level that can be attained as a result of one-week workshops. They call for further research in this area as well as more workshops like the one studied until permanent secondary urban agriculture programs can be established.

Some questions:

1. The results comparing 2007 and 2008 workshops are intriguing. Did you look into differences between the workshops related to curriculum, instructors, and student characteristics beyond basic demographics? Are there any other possible explanations that might account for this finding?
2. What are the challenges of using a retrospective post then pre test when you are looking at perceived levels of knowledge with a set of high school aged participants?

The Relationship Between Changes in Self-efficacy and Career Interest for Participants of an Agricultural Communications Workshop

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In response to the prediction that there will be more jobs than there will be qualified personnel to fill them (Goecker, Gilmore, Smith, E., & Smith, P.G., 2005), a workshop was created to introduce urban, minority students to agriculture careers toward the goal of laying the groundwork for increasing diversity in agriculture and shortening the gap between the number of jobs and candidates to fill them. The purpose of this study was to assess the relationship between change in self-efficacy and change in career interest for participants of the workshops. Workshops were designed and delivered in the summers of 2007 and 2008 to introduce urban, minority students enrolled in local science programs to agriculture through agricultural communications. Participants were provided introductory instruction in risk/crisis communication, news writing, video, photography, and Web design. While significant relationships were found, they were not consistent enough to make definitive conclusions about the relationship between the variables, but they did offer enough insight to make a change to the Settle, Doerfert, and Akers (2008) college decision web. The changes made to the model reflected self-efficacy as existing in specific and general level and the corresponding relationships they would have with interest.

Introduction

Fewer agricultural bachelor degrees are being awarded during a time when the agriculture industry is facing a shortage of qualified workers (Goecker, Gilmore, Smith, E., & Smith, P.G., 2005; U.S. Department of Education, 2007). A possible solution to this problem is to supplement the traditional recruitment base for Colleges of Agriculture (COAs) in dwindling, rural demographics by recruiting urban students (Department of Economic and Social Affairs Population Division, 2002).

Williams (2007) recommended exploring opportunities to increase underrepresented groups in agriculture. In states such as Texas and California, the minority populations constitute more than 50% of the total population (Brady, Hout, Stiles, Gleeson, & Hui, 2005; Caldwell, 2005). Russell (1993) recommended focusing recruiting efforts on students who are already receiving positive information about agriculture, such as 4-H and FFA members. Esters (2007) suggested using current efforts and creating more specialized urban agricultural education programs as a source to increase diversity in COAs. But until these can be set up, other avenues should be sought out that will give urban students experience with agriculture that they would not likely receive otherwise.

Workshops could serve as the avenue for increasing diversity in agriculture. "Educational interventions" (Newsom-Stewart & Sutphin, 1994, p. 55) were deemed necessary to improve perceptions of agriculture by minorities. Fritz, Ward, Byrne, Namuth, and Egger (2004) were successful in improving perception of biotechnology for individuals through a workshop taught by individuals with expertise in biotechnology. Wiley, B.E. Bowen, C.F. Bowen, and Heinsohn (1997) experienced similar results for a workshop in food and agricultural sciences for pre-college participants. Both results were shown to be maintained a year after the workshops were conducted.

Related Literature

Self-efficacy is a belief in one's ability to achieve a desired result. Self-efficacy affects behavior directly and indirectly through its effects on goals, expectations, and perception of hurdles and potential rewards (Bandura, 2006). Compeau and Higgins (1995) divided self-efficacy into three dimensions. The first division is magnitude, which refers to the level of task difficulty that one believes they can overcome. The second division is strength, which refers to how easy or difficult it is to change one's sense of self-efficacy. The final division is generalizability, which refers to whether the self-efficacy is relevant only to a specific task or is broader in what it relates to. Bednar and Petersen (1995) suggested that when one anticipates success in a venture, the venture is more likely to be successful, even in the face of difficulty.

It was concluded by Degenhart, Wingenbach, Mowen, Lindner, and Johnson (2008) that interest affects attitude. With this conclusion also comes the assertion by Atwater, Wiggins, and Gardner (1995) that attitude affects career choice. Holding these results to be true, interest affects career choice at the very least indirectly.

Lynch (2001) found that personal decision was the most influential reason for student enrolling in a college agricultural program. But it has been indicated that students' current

interest, as is, might not be the best route. Students need to expand their career interests rather than just relying on matching a career to their current interests (Krumboltz & Worthington, 1999). Boumtje and Haase-Wittler (2007) reached a similar conclusion in that they stated the variety of careers in agriculture needs to be promoted. Savickas (1999) stated that individuals who were aware of their opportunities and made the necessary plans fared better in their career search than those who did not.

Research has also indicated that self-efficacy and interest affect each other. Esters and Knobloch (2007) concluded that self-efficacy was a strong indicator of interest for Korean high school students as they relate to agriculture. Deganhart, Wingenbach, Dooley, Lindner, Mowen, and Johnson (2006) found that attitude toward specific careers related to middle school students' perceived abilities in those subject areas.

It was also concluded that interest can shape ability by causing individuals to self-limit their experiences based on their own interests (Roberts, Caspi, & Moffitt, 2003; Schooler, 2001). These effects could become more stable in adulthood because adults are more able to select the environments they are in (Ickes, Snyder, & Garcia, 1997; Scarr, 1996). Essentially, interest limits experience, which in turn can limit the abilities that individuals can acquire or discover thereby decreasing self-efficacy in those areas.

Swanson and Fouad (1999) stated that "career counselors and school-to-work specialists need to help students develop a sense of their own skills, interests, and values as they make vocational choices," (p. 341). This goal of self-realization for the students could be achieved through workshops that expose them to different aspects of the world around them. Workshops have been shown to be successful in the past through attitudinal change. Both the Fritz et al. (2004) and the Wiley et al. (1997) studies sustained the positive attitude gains a year after the workshops occurred.

Settle, Doerfert, and Akers (2008) outlined a framework of various influences on students' choice of whether or not to attend a college of agriculture at various points in the decision process (Figure 1). Relevant to this study is how self-efficacy affects predisposition to attend college, while interest affects the later stages of college search and choice. The decision web created suggested that self-efficacy affects interest. Of importance is the relationship that occurs between the changes in self-efficacy and interest that take place as a result of the workshop.

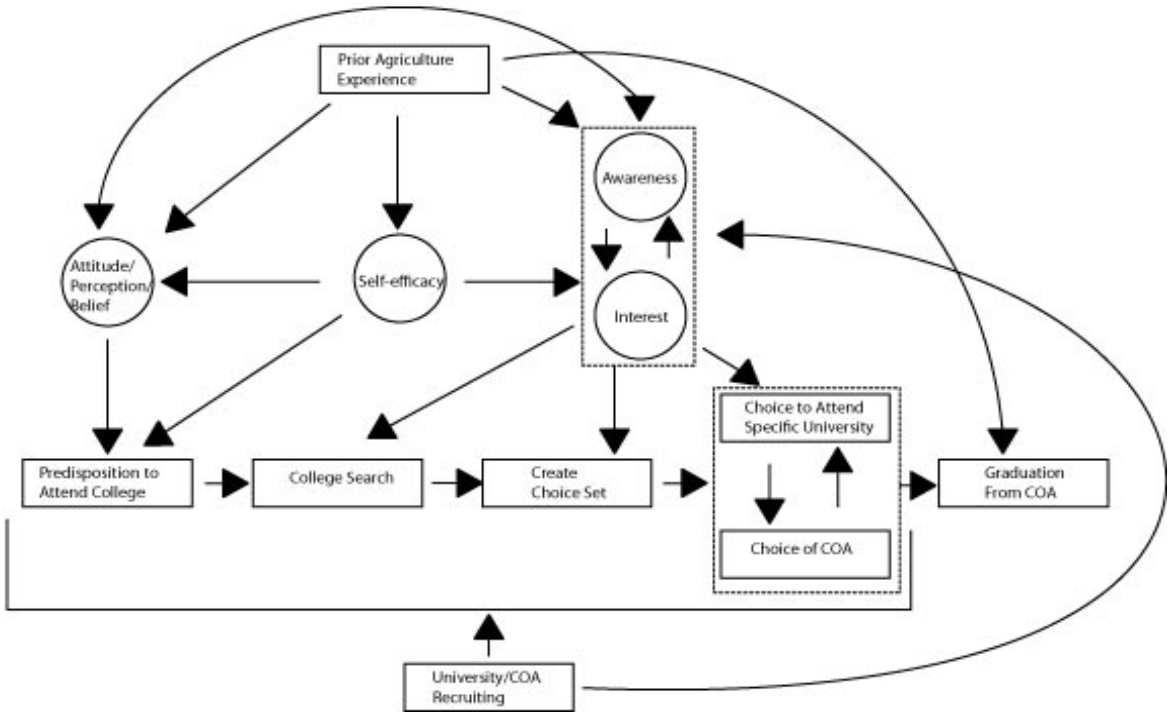

Figure 1. College-decision web for prospective college of agriculture students (Settle, Doerfert & Akers, 2008)

It does need to be noted, though, that opportunity does not guarantee success. Scarr (1996) posited that the success of one individual and failure of another without the same opportunities may be more readily explained by genetic variability than by the nature of their environment. The researcher indicated that interventions targeted toward lower socioeconomic groups were inherently flawed because the parents of these individuals were more likely to be at lower intelligence levels than higher socioeconomic parents and would therefore be passing on that trait to their children.

Purposes and Objectives

This research falls into the National Research Agenda areas of Agricultural Communications for building "competitive societal knowledge and intellectual capabilities" (Osborne, n.d., p. 10) and Agricultural Education in University and Postsecondary Settings for recruiting and preparing "students for the future workforce in the agricultural and life sciences" (p. 16). The purpose of this study is to assess whether changes in self-efficacy and changes in career interest affect each other. Specifically, the objectives of this study are

1. Describe changes in self-efficacy and career interest in urban high school minority students that participated in a summer agricultural communications workshop.
2. Describe any relationship between change in self-efficacy and change career interest.

Methodology

This study consisted of a pre-workshop evaluation of self-efficacy and career interest levels for participants of an agricultural communications workshop and a post-workshop assessment of self-efficacy and career interest after five days of instruction in risk/crisis communications, photography, video, Web design, and news writing. The population for this study was all workshop participants ($N = 24$). Workshop participants were 44% Hispanic, 36% African-American, 16% White, and 4% Native American.

Three workshops were conducted at urban high schools in three different states during the summer of 2008. Two of the sites did not have formal agriculture programs in place, but the third site was an agricultural magnet school. The study essentially consisted of two groups: one with formal secondary-level agricultural education and one without.

The self-efficacy section of the instrument for this study was adapted from the Compeau and Higgins (1995) instrument used to assess computer-use self-efficacy and was also made using suggestions from Bandura (2006) regarding the creation of self-efficacy scales. The self-efficacy scale ranged from 0 = "Cannot do it at all" to 10 = "Highly certain that I can do it." The career interest scale ranged from 0 = "Very strongly disagree" to 10 = "Very Strongly Agree." Cronbach's Alpha was assessed *post hoc* for the self-efficacy and career interest sections, pre- and post-workshop. The reliability scores for self-efficacy toward tasks were 0.89 pre-workshop and 0.86 post-workshop. For self-efficacy toward obstacles, reliability scores were 0.86 pre-workshop and 0.84 post-workshop. The reliability scores for the career interest section were 0.88, pre-workshop, and 0.83, post-workshop. Davis' conventions (1971) (as cited in Kotrilik, Redmann, Harrison, & Handley, 2000) will be used to describe correlation strength.

The study was comprised of three workshops in the summer of 2008. Data were collected for the pre-workshop section before participants began the first lesson of their respective workshop. The post-workshop data were collected on the final day of the respective workshops. Both sets of data were collected using an online questionnaire.

Results/Findings

As shown in Figure 2, the only areas of self-efficacy toward specific tasks not to increase between assessments were for constructing a Web site, creating a Web site with outside images, and writing a news story. Self-efficacy toward the task of needing to interview at least 10 people for a news story was the criterion to increase the most between assessments. Figure 3 shows an even number of criterion that increased and decreased between assessments for self-efficacy toward obstacles. Participants increased the most for the criterion related to their family being opposed to the participant getting a degree in agricultural communications. The biggest decrease occurred where attending an out-of-state school was required. Figure 4 shows that the two career interest areas to increase the most were for careers in traditional communications and agriculture. The only decreases to occur were for careers in Web design and video.

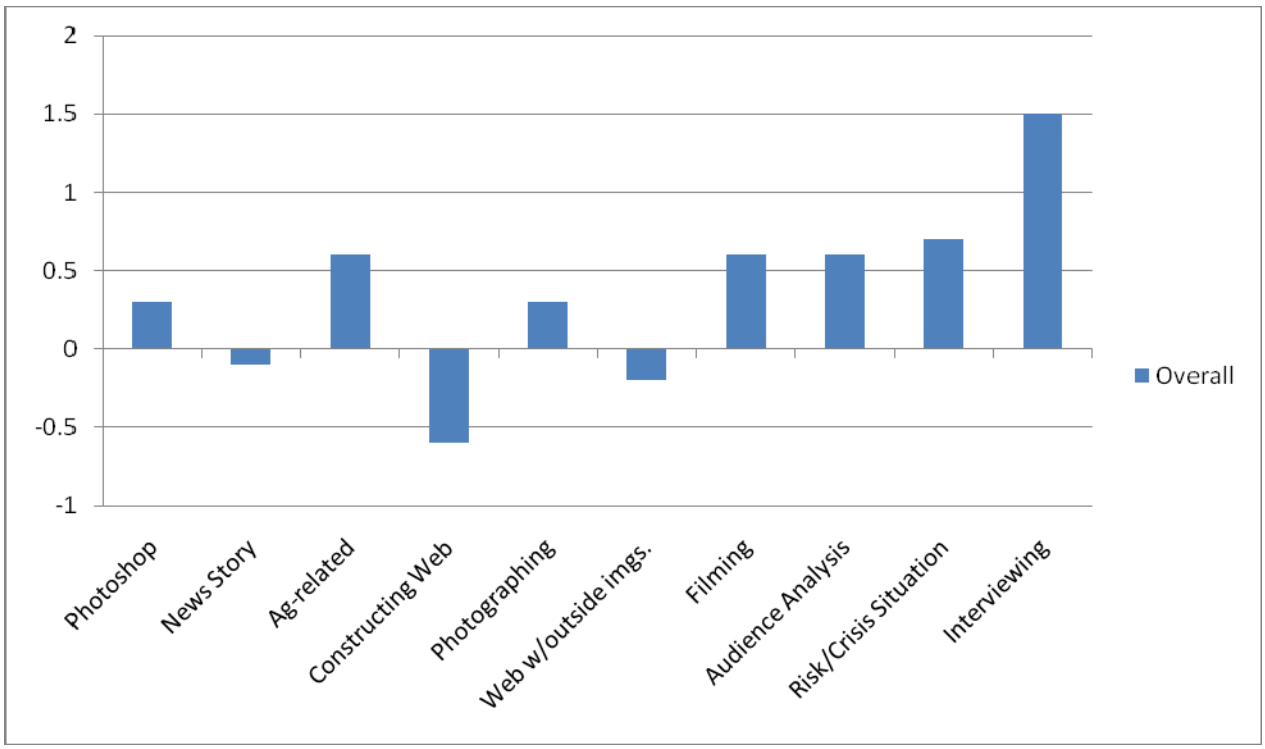

Figure 2. Change in self-efficacy toward tasks for workshop participants.

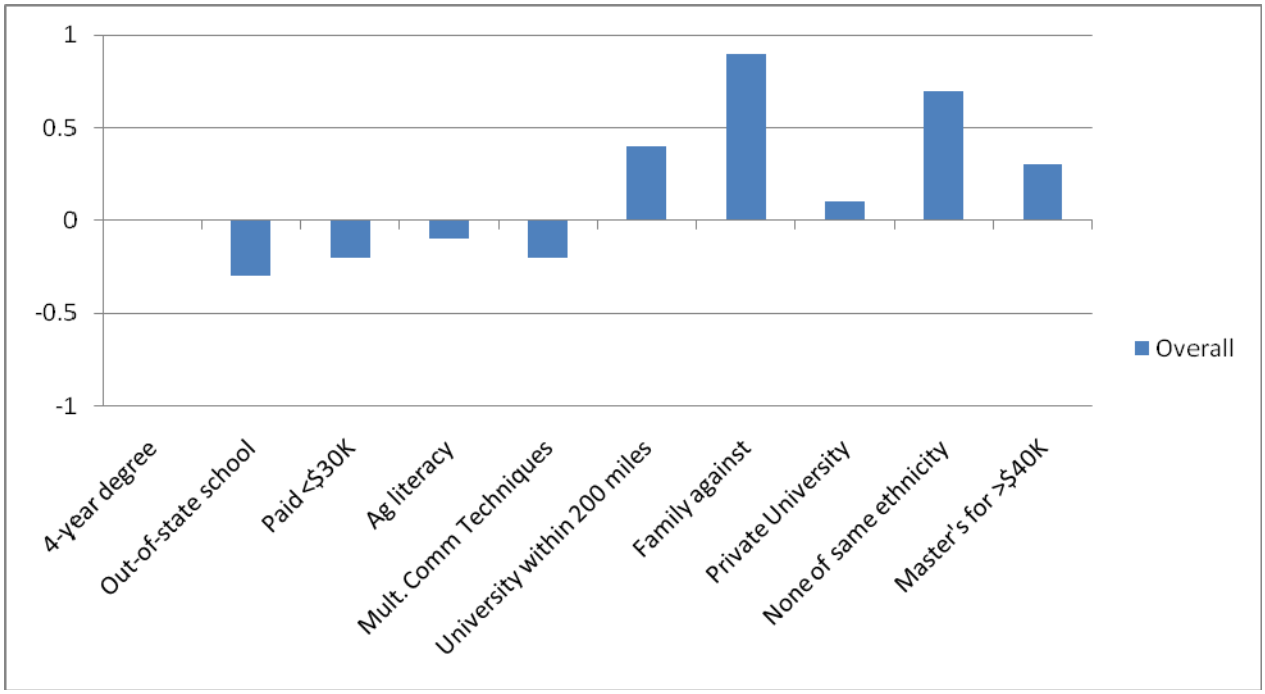

Figure 3. Change in self-efficacy toward obstacles for workshop participants.

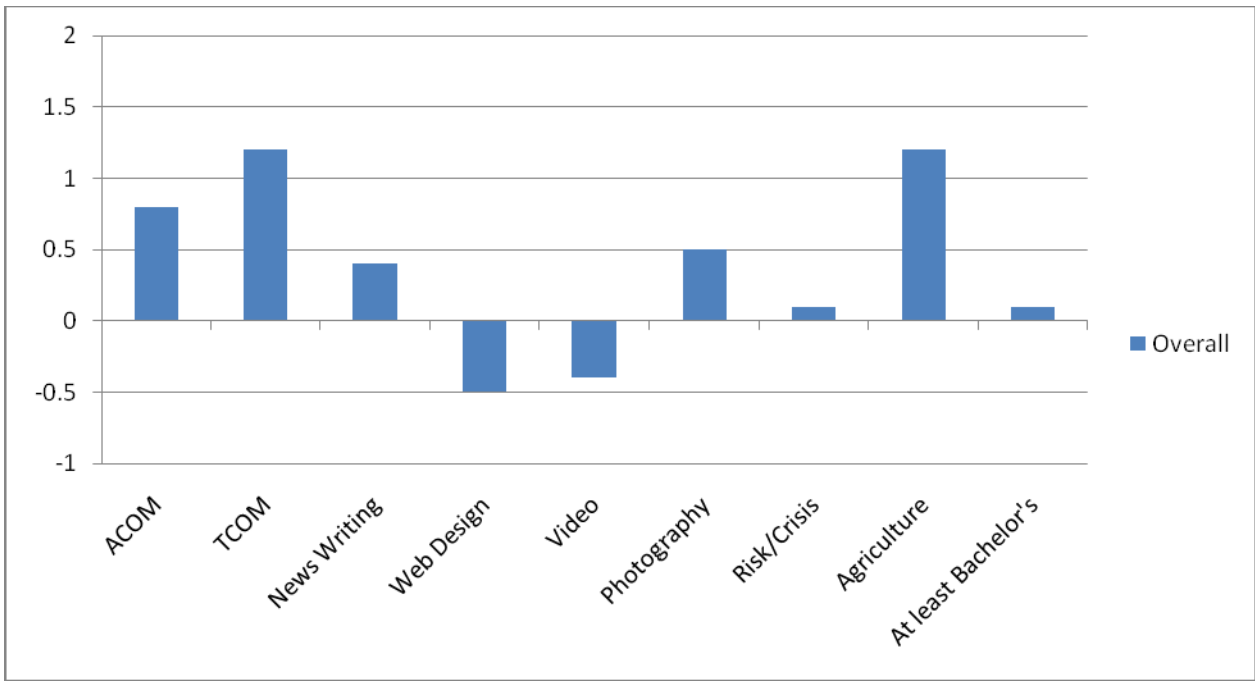

Figure 4. Change in career interest levels for workshop participants.

Change in interest for careers in news writing, video, and risk/crisis communications were the only variables not to be significantly ($p < 0.05$) related to any changes in self-efficacy toward task variables (Table 1). Change in interest for a career that requires at least a bachelor's degree was related significantly to the most change in self-efficacy toward task variables. Change in self-efficacy for completing a task related to agriculture had a substantial relationship with change in interest for careers in agricultural communications ($r = 0.53$) and agriculture ($r = 0.60$). Change in interest for a career that requires at least a bachelor's degree had a substantial relationship with change in self-efficacy for assessing who was most at risk during a risk/crisis situation ($r = 0.54$) and completing a news story ($r = 0.57$). Change in self-efficacy for creating a Web site with outside images had a substantial relationship with change in interest for a career in Web design ($r = 0.55$).

Table 1

Relationship Between Change in Self-efficacy Toward Completing Tasks and Change in Career Interest (N = 24)

	I am interested in a career in								
I could complete task if it required	ACOM	TCOM	News	Web	Video	Photo	Risk/Crisis	Agriculture	Bachelor's
Altering photos with Photoshop	0.35	-0.33	0.02	0.33	0.10	-0.23	-0.06	0.26	0.25
Completing a news story	0.12	0.05	0.27	0.38	0.25	-0.06	0.04	0.04	0.57*
Being related to agriculture	0.53*	0.10	0.09	0.29	-0.14	-0.16	-0.07	0.60*	0.00[a]
Constructing a Web site	0.36	-0.14	0.00[a]	0.49*	0.21	0.20	-0.04	0.38	0.14
Photographing ag-related images	0.33	0.00a	-0.04	0.26	-0.34	-0.26	-0.24	0.47*	0.09
Creating Web site w/ outside images	0.36	0.09	0.11	0.55*	0.26	0.03	0.02	0.34	-0.02
Filming ag-related images	0.09	-0.10	-0.04	0.23	0.04	-0.07	-0.06	0.05	0.43*
Understanding who the audience is	0.16	0.16	0.17	0.23	0.02	0.00[a]	-0.20	0.27	0.44*
Assessing who's most at risk	-0.24	0.08	-0.15	0.17	0.29	0.27	0.00[a]	-0.16	0.54*
Interviewing 10 for news story	-0.04	0.49*	0.16	0.18	0.33	0.46*	-0.11	0.04	0.15

Note. Self-efficacy answers ranged from 0 = "Cannot do it at all" to 10 = "Highly Certain that I can do it." Career interest answers ranged from 0 = "Very strongly disagree" to 10 = "Very strongly agree."

*$p < 0.05$

Of the change in self-efficacy toward obstacles variables, needing a master's degree to earn more than $40,000 annually was the best indicator of change in interest, being significantly related to traditional communication ($r = 0.42$), news writing ($r = 0.43$), Web design ($r = 0.46$), and agricultural communications ($r = 0.63$) (Table 2). The best indicators of change in self-efficacy toward obstacles were changes in interest for a career in traditional communications and a career that requires at least a bachelor's degree. Change in interest for a career in traditional communications was significantly related to change in self-efficacy for a master's degree being required to earn more than $40,000 annually, it being required to attend a four-year university ($r = 0.42$), and it being required to attend a private university ($r = 0.49$). Change in interest for a career that requires at least a bachelor's degree was significantly related to changes in self-efficacy for it being required to attend a private university ($r = 0.49$), it being required to go to a four-year university ($r = 0.59$), and careers typically paying less than $30,000 annually ($r = 0.63$). Change in interest for a career that involves risk/crisis communications had a substantial relationship with change in self-efficacy for there being a lack of ethnic diversity in agricultural communications ($r = 0.56$). Change in interest for a career in agricultural communications had a substantial relationship with change in self-efficacy for there being a university within 200 miles that offered the degree ($r = 0.61$).

Table 2

Relationship Between Change in Self-efficacy Toward Obstacles and Change in Career Interest (N = 24)

	I am interested in a career in								
I could complete a degree in Agricultural Communications if	ACOM	TCOM	News	Web	Video	Photo	Risk/Crisis	Agriculture	Bachelor's
It required going to school 4 years	0.05	0.42*	0.03	0.16	0.27	0.41	-0.36	-0.09	0.59*
It required out-of-state school	0.04	0.21	-0.07	0.04	0.17	0.33	-0.14	0.07	0.28
Careers typically paid < $30,000	-0.04	0.11	0.08	0.15	0.02	0.26	-0.37	0.01	0.63*
It required basic knowledge of ag	0.26	0.18	0.04	0.07	0.09	0.17	-0.16	0.20	0.08
It required mult. comm techniques	0.14	0.08	0.00[a]	0.15	0.05	0.04	-0.08	0.33	0.24
A university was within 200 mi.	0.61*	0.29	0.25	0.36	0.04	-0.08	0.08	0.42*	0.17
My family was against degree	0.13	0.23	0.05	-0.02	0.18	0.18	0.15	0.34	0.01
It required attending private univ.	0.23	0.49*	0.33	0.42*	0.36	0.17	0.21	0.13	0.49*
There were no people of my ethnicity	0.05	0.05	0.09	0.13	0.15	-0.21	0.56*	-0.12	0.34

Master's degree required for +$40K	0.63*	0.42*	0.43*	0.46*	0.20	-0.18	0.25	0.30	-0.07

Note. Self-efficacy answers ranged from 0 = "Cannot do it at all" to 10 = "Highly Certain that I can do it." Career interest answers ranged from 0 = "Very strongly disagree" to 10 = "Very strongly agree."

*$p < 0.05$

Conclusion/Implications/Recommendations

Change in interest for a career that requires a bachelor's degree was the best indicator of change in self-efficacy toward tasks. The only change in self-efficacy toward tasks and change in career interest variables to be significantly correlated that were in the same interest area were for agriculture and Web design. For agriculture, change in self-efficacy for a task being related to agriculture was positively correlated with change in interest for careers in agriculture and agricultural communications. Change in interest for a career in Web design was positively correlated with change in self-efficacy for the tasks of constructing a Web site and creating a Web site that incorporated outside images. While these two areas were able to match up, the relationship between change in self-efficacy toward tasks and change in interest were not consistent enough to make definitive conclusions about the relationship between the variables, but there is support for the Degenhart et al. (2006) conclusion that self-efficacy and interest affect each other.

Change in interest for a career in traditional communications and a career that requires at least a bachelor's degree were the best indicators of change in self-efficacy toward obstacles. Change in self-efficacy for a master's degree being required to earn more than $40,000 annually was the best indicator of change in career interest. Change in self-efficacy toward obstacles was more closely related to the change in interest for the variables that reflected the overall approach of the workshop – agriculture, agricultural communications, traditional communications, and a career that requires at least a bachelor's degree – than for the variables that were reflective of individual lesson areas.

Based on interest being the most influential reason students enter an agriculture program (Lynch, 2001) and more general self-efficacy being a better indicator of behavior than specific areas of self-efficacy (Bandura, 2006), self-efficacy toward obstacles is generalizable in nature. This would explain why self-efficacy toward obstacles related more to the general interest variables than the more specific ones.

Given the number of significant correlations that occurred between the change in self-efficacy and change in interest variables, there is a relationship between the two. The lack of continuity between workshops, lessons, instructors, and students could have contributed to the lack of consistency that occurred, though. In similar future endeavors, continuity between workshops needs to be stressed, and the questionnaire utilized needs to be improved to address specific self-efficacy and interest areas better.

Based on the results from this study and from the reviewed literature, changes are recommended for the Settle et al. (2008) decision web (Figure 5). These changes reflect the nature of self-efficacy existing as both general and specific and the corresponding relationships with interest that occur.

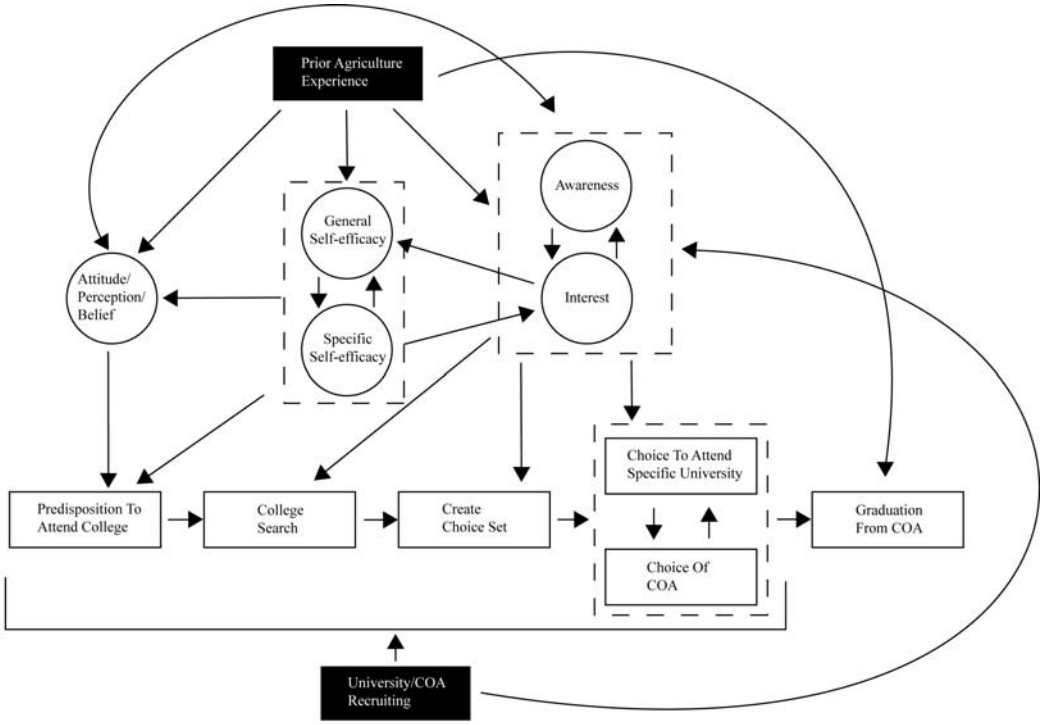

Figure 5. Revised version of Settle, Doerfert, and Akers (2008) decision web.

Future qualitative research needs to be conducted to conclude that the direction of these relationships is correct. Self-efficacy toward obstacles, specifically, needs to be addressed from a qualitative approach to verify where it fits in the big picture. For research regarding self-efficacy toward tasks and career interest, the number of variables should be increased. This would allow for an assessment of broader tasks and specific tasks. A comparison could then be made between the average of the levels of self-efficacy toward tasks and what students report is there self-efficacy for agricultural communications as a whole.

Another area of notice for interventions targeted toward improving interest and self-efficacy, which is a component of self-esteem, is the conclusion made by McGuire (1968) that attitude change occurs in a negative parabola fashion in relation to self-esteem. This basically means that students with moderate levels of self-esteem benefit the most from interventions targeted toward self-esteem. Individuals with low self-esteem would have too high of anxiety levels to take in the message and individuals with high self-esteem would have confidence in their views and would be unlikely to yield to outside influences. Future research could compare initial levels of self-efficacy to the changes in self-efficacy and interest that occurred.

Given the conclusions that students with a background in agriculture are more likely to pursue and complete a degree in agriculture (Boumtje & Haase-Wittler, 2007; Dyer, Breja, & Wittler, 2000; Dyer, Lacey, & Osborne, 1996), the main route that should be pursued to increase diversity in agriculture is to set up permanent, urban youth agriculture programs. Until they can

be set up, however, interventions should still occur targeted toward increasing education, awareness, and interest in agriculture.

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The Relationship Between Changes in Self-efficacy and Career Interest for Participants of an Agricultural Communications Workshop.

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The authors provide interesting findings related to a very important but also challenging area in undergraduate agricultural college education – increasing the diversity in agricultural college majors through recruitment of students. This correlational study provides insight into the role of self efficacy and career interest in influencing urban minority students' change in interest for a career in agricultural communications.

The authors develop a solid theoretical framework based in the self efficacy and career choice/student recruitment literature. They focus their review of literature on a college decision web that they had proposed through research conducted in a previous study, and they revised their conceptual framework slightly on the basis of the findings of the current study.

The study focuses on participants of a workshop specifically designed to provide learning experiences in tasks related to career fields in agricultural communications and exposure to information about agriculture, agricultural communications and undergraduate education in general. Participants were given a pre- post test assessment before and after the workshop. Findings indicated that change in interest for a career that requires a bachelor's degree was the best indicator of change in self-efficacy toward tasks and obstacles associated with obtaining a college education. Self-efficacy toward the task of needing to interview at least 10 people for a news story was the criterion to increase the most between assessments of tasks, while the two career interest areas to increase the most were for careers in traditional communications and agriculture.

The authors identify a need for interventions targeted toward improving interest and self-efficacy, especially toward those with a moderate level of self efficacy, and advocate for permanent, urban youth agriculture programs to increase diversity in agriculture.

A few questions about the study:

1. In this study, key obstacles for participants turned out to be "family against" and "none of same ethnicity". Do you think a workshop like the one analyzed in this study can influence perceptions of these barriers? How should they be addressed by academic institutions wanting to increase diversity in agriculture?
2. Workshop participants were predominantly Hispanic, followed by African American, Caucasian and Native American. Although the population was too small to analyze this, do you think other factors might be associated with any of the variables in your study—what about gender, socio-economic status, pre-existing attitudes, etc.? If so, can you predict what factors might exert the most influence?
3. In the study, the authors recommend permanent establishment of urban youth agriculture programs as necessary components of an attempt to increase diversity. What are your thoughts on how this could be done, and how academic institutions of higher learning should be involved?

Agricultural Communication Students' Perceptions, Knowledge and Identified Sources Of Information About Agritourism

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Abstract

Agritourism is a topic that has not been evaluated at the collegiate level. The purpose of this study was to determine the knowledge and sources of information of agricultural communications students at the collegiate level. This quantitative descriptive study assessed agricultural communications students (N = 66) from 11 different universities across the nation to determine agricultural communications students' perceptions, knowledge, and identified sources of information regarding agritourism. The study maintained an 80.5% response rate. Respondents ranked agriculture (M = 4.98) and agritourism (M = 4.45) as important. Agriculture-related festival(s) or event(s) (M = 4.46) were noted as the most important agritourism venue. Generally, respondents had previously attended an agritourism event (61.5%). Word-of-mouth (81.5%), Web site (95.4%) and print advertisement(s) (93.8%) were identified as the best sources of information in promoting agritourism. Most respondents were female (81.0%), and the majority of respondents were majoring in agricultural communications (65.6%). Almost all respondents had families involved in agriculture (95.2%). Over half of the respondents indicated not knowing whether or not their state had an agritourism department (52.3%). Future studies involving non-agricultural students' perceptions and knowledge of agritourism should be conducted.

Literature Review

Twenty percent of the population in the United States lives in rural areas, but only 1% is directly employed in agriculture (Carpio, Wohgenant, & Boonsaeng, 2008). In 2004, farm-based recreation or agritourism, which includes hunting, fishing, horseback riding, and other on-farm activities, provided income to about 52,000 U.S. farms (2.5%) (Brown & Reeder, 2007). Agritourism is any activity, enterprise or business designed to increase farm and community income by attracting the public to visit agricultural operations and outlets that provide educational and/or recreational experiences to help sustain and build awareness of the rural quality of life (University of Arkansas Division of Agriculture, 2006). Agritourism can provide a way for improving the incomes and potential economic viability of small farms and rural communities. Agritourism can be a supplementary, complimentary or primary enterprise for a farm. "Travel and tourism are big businesses across the globe. In the United States alone, leisure travelers spend more than $341 billion and support more than 5.85 million jobs" (Blacka et al., 2001 p.5). Agritourism is increasing in popularity (Pittman, 2006) as a way for traditional agricultural producers to become financially stable and provide a profit.

Agritourism operations exist in every state, and in many states, organizations, state officials, citizens, and others have undertaken efforts to enhance agritourism. Several states have agritourism promotion efforts underway, including Alabama, Mississippi, Missouri, Utah, North Carolina, Kansas, Oklahoma and New Mexico (Pittman, 2006). The types of efforts and the degree to which they are undertaken in these and other states vary substantially. For example, efforts made in some states involve the state government, while others are conducted by non-governmental associations or through university systems. The Virginia Cooperative Extension Services suggested promoting agritourism businesses by word-of-mouth, printed materials, media, direct mail, community network and a Web site (Blacka et al., 2001).

Agritourism can be defined in a variety of ways. In general terms, Pittman (2006) called agritourism the crossroads of tourism and agriculture. Pittman's study of agritourism which classified agritourism as any activity, enterprise or business designed to increase farm and community income by attracting the public to visit agricultural operations and outlets that provide direct sales, educational, and/or recreational experiences to help sustain and build awareness of the rural quality of life. The Tennessee Agritourism Initiative defines agritourism as "an activity, enterprise, or business which combines primary elements and characteristics of agriculture and tourism, and provides an experience for visitors which stimulates economic activity and impacts both farm and community income" (Bruch & Holland, 2004, p.1). The Tennessee group explained that attractions often meeting this definition include agriculture-related and on-farm events; including places, such as museums, festivals and fairs, century farms, corn-maze enterprises, farmers markets, tours, retail markets, festivals and fairs, petting zoos, fee-fishing, horseback riding, bed-and-breakfast establishments, pick-your-own produce farms, and wineries. In addition, in other states like Arkansas, on-farm hunting involving the farm's agricultural resources as a part of the hunting enterprise (i.e. rice fields for duck hunting) is also categorized as agritourism (Ramsey & Schaumleffel, 2006).

Many terms are employed in the literature describing tourism activity in rural areas: agritourism/agrotourism, farm tourism, rural tourism, soft tourism, alternative tourism, ecotourism, green tourism and several others. Though these terms are sometimes used interchangeably, most, technically, have specific meanings, and these meanings may differ,

especially across regions and internationally (Roberts & Hall, 2001). Although various names have been used to identify expanding agricultural enterprises to the general public, the common thread is rural areas expanding on current agricultural endeavors. These endeavors are used to capitalize on tapping additional resources with the traditional distinction that recreation includes activities carried out by day-visitors, whereas to qualify to be a tourist you have to stay overnight (Tribe, Font, Griffiths, Vickery, & Yale, 2000).

The continual growth of agritourism in America is a relatively recent phenomenon when compared to farm-stay programs and working farms that have existed for years in Europe. In the early 1990s almost 25 percent of vacations were spent in a rural setting in Europe (Tribe et al., 2000).With a large population living in rural areas and such a small population employed directly by agriculture it can be assumed that individuals will visit agritourism operations because there are limited options for entertainment. Because of the limited number of entertainment offerings individuals are more likely to participate in agritourisms activities (Bruch & Holland, 2004; Carpio, Wohlegenant, & Boonsaeng, 2008).

In the previous thirty years, agritourism has become a more relaxed setting. It can be an escape from urban life and activities such as picnicking and fishing which contribute to the feeling of harmony (Hall, Mitchell, & Roberts, 2003). It was indicated in a report by Carpio et al. (2008) that white individuals are 10% more likely to visit a farm and families with children six years of age and younger are 4% more likely to visit a farm as an entertainment venue. The study reported that the average number of trips to a farm was approximately 10 times, with an estimated expenditure of $174.82 per trip. The type of tourist that visits agritourism venues differs demographically; but it is important to understand who is visiting the family farm in order to better serve the tourist and to ensure that economic growth and diversity continues (Koh & Hatten, 2002).

Agricultural communications students have not been previously surveyed regarding their perceptions and knowledge of agritourism; yet, they may have an influence on advertising and marketing these venues in the future. These students are the future of promoting agriculture and it is important to determine knowledge level and where they gain information regarding an array of agritourism-related topics. This study will also assist agritourism enterprises with a perspective regarding where college-aged students are finding information regarding agricultural venues. These agricultural communications students should be targeted to determine their perceptions, knowledge, and sources regarding agritourism. An exhaustive literature review failed to identify previous research that measured agricultural communications students' perceptions, knowledge, and sources of information regarding agritourism Therefore, it is important to determine agricultural communications students' knowledge, perceptions, interests, experiences and sources of information regarding agritourism. This information would also assist faculty in designing university curriculum to assist agricultural communications students in promoting and supporting agriculture, specifically agritourism.

Conceptual Framework

This study was grounded by topics relevant to this study: (1) agritourism; (2) educational program planning in agriculture; and (3) adult program planning. The theoretical framework was

based on McQuail's' (2005) Media-Society Theory III: Functionalism theory. This theory influenced the design of the study.

A common model used in adult education is the Lifelong Education Program Planning (LEPP) model by Rothwell and Cookson as cited in Kilgore (2003). The model consists of four quadrants: exercising professional responsibility, engaging relevant contexts, designing the program, and managing administrative aspects. The steps are modeled to exercise professional responsibility because it is important to ensure that the program meets the needs of the students (Rothwell & Cookson, 1997 as cited in Kilgore, 2003). Before teaching a sound agricultural communications program, an assessment could be utilized to determine learners' current knowledge and needs (Seevers, Graham, Gamon, & Conklin, 1997). An assessment would determine the educational needs of interested agritourism entrepreneurs or students who can/may incorporate agritourism into the family farm. Kilgore (2003) touts that a program planner's work is never done and just as the needs change for adults in education they will continually change for agritourism and one way to educate the special needs of adult students is by having a college level course to educate about agritourism.

Adults' deep need to be self directing is particularly important in program planning. Boone, Saffret and Jones (2002) wrote that target publics make their own decision about educational needs and what will fulfill those needs. Therefore, successful program planning for adults typically begins by determining adults' attitudes and perceptions.

McQuail's Media-Society Theory III: Functionalist theory (2005) explains how information is diffused through a social system and consists of five elements. These elements are information, correlation, continuity, entertainment and mobilization (McQuail, 2005). Information consists of providing facts about events and facilitating innovation (McQuail, 2005). A study conducted by the state of Pennsylvania asked operators to rate their top five resources to market agritourism as well as visitors to use of resources (Ryan, DeBoard, & McCellan, 2006). The operators ranked word-of-mouth, repeat business, newspaper ads, brochures and Internet/ Web sites as the top five while the visitors ranked Internet/ Web sites, information/ welcome centers, brochures, travel books/guides and word-of-mouth as their top sources for finding information about agritourism (Ryan et al., 2006). This information depicts where agritourism visitors and operators get information about agritourism activities.

Purpose and Objectives

The purpose of this study, which was part of a larger study, was to determine the perceptions, knowledge and sources of information regarding agritourism of agricultural communications students. The specific objectives were to assess (1) perceptions, (2) knowledge, (3) sources of information about agritourism at the collegiate level, (4) and identify select participant demographics. A specific understanding of agricultural communications students' perceptions and knowledge about agritourism is not clear and can be used to identify specific educational strategies for collegiate students, agritourism proprietors and universities.

Methodology

This study utilized a descriptive survey methodology. The statistical analysis was descriptive in nature, and the instrumentation followed Dillman's Total Tailored Design method (2007). The target population for this study included all participants at the Agricultural Communicators of Tomorrow (ACT) Professional Development Conference held in Stillwater, Oklahoma February 26 - March 1, 2009. This audience was identified due to their background and knowledge of communication and media sources. Currently, thirteen universities have ACT (Agricultural Communicators of Tomorrow) chapters. There were 91 students registered for the 2009 conference and 82 attended the four-day event.

Prior to the conference an instrument was developed. Questions for the instrument were modeled after a previous study completed by Sussex County Office of Conservation and Farmland Preservation in New Jersey (New Jersey Agritourism Survey: Highlands Region, n.d.) and based on a survey conducted in Tennessee (Jensen, Dawson, Bruch, Menard, & English, 2005). The questionnaire booklet consisted of twenty-five questions and was designed by the principal researcher. The study was designed to collect perceptions, knowledge, sources of information, and select demographics of agricultural communications' students attending the 2009 ACT conference. A field test was administered to faculty in an Agricultural and Extension Education Department (AEED) at the University of Arkansas and resulted in minor changes to the instrument to improve clarity, and establish face and content validity.

The instrument was administered to eighteen field test participants, and a follow-up instrument was provided two weeks later to determine instrument stability. Instrument stability was tested using agreement percentage and resulted in 71.3% agreement. There were sixty-six respondents from the 2009 ACT conference, resulting in an 80.5% response rate. Data were analyzed using the Statistical Software for Social Sciences (SPSS) 15.0.

Findings

Perceptions of Agritourism

Respondents ranked the importance of two terms, agriculture and agritourism, on a 5 point Likert-type scale (1.00 – 1.49 = Very Unimportant; 1.50 – 2.49 = Slightly Unimportant; 2.50 – 3.49 = Neutral; 3.50 – 4.49 = Slightly Important; 4.50 – 5.00 = Very Important). Agriculture had the highest mean with a score of 4.98, followed by agritourism (M = 4.45).

Respondents rated the importance of 11 agritourism venues on a 5 point Likert-type scale (1 = very unimportant and 5 = very important). Responses in Table 1 indicate that eight of the 11 venues had means of 4.0 or greater. The most important perceived agritourism venue was agriculture-related festival(s) or event(s) (M = 4.46). Pick-your-own produce or fruits and on-farm hunting tied as the second most important venues (M = 4.28). The least important perceived agritourism venue was on-farm fishing (M = 3.69).

Table 1

Respondents' Perceived Importance of Agritourism Venues (n = 65)

Venues	*M*	*SD*

Agriculture related festival or events	4.46	0.75
Pick-your-own produce or fruits	4.28	0.86
On-farm hunting	4.28	0.86
Winery	4.26	0.91
Agriculture-related museum	4.26	0.91
Community farmers' market	4.23	0.84
Christmas tree farm	4.23	0.89
Pumpkin Patch	4.12	1.01
On-farm lodging	3.80	0.96
On-farm retail outlet	3.71	0.86
On-farm fishing	3.69	0.93

Knowledge of Agritourism

An open-ended question was used to determine how respondents defined agritourism. Eleven primary themes resulted from the open-ended question. Of the 55 responses, 26 (47.3%) included the word "tour." The following is an example response: "Touring agricultural related locations for education and information." Six respondents (10.9%) noted the word "visit." A typical response was, "Visiting or touring agricultural related businesses and industries." Four (7.3%) mentioned "show," with an example being, "Showing the world agriculture from every perspective." Entertainment was mentioned by one (1.8%) respondent who stated, "Using agriculture as a source of entertainment and information for the public."

Respondents were questioned about whether or not their home state had an agritourism department. Of the respondents (n = 65) over half 52.3% did not know if their state had an agritourism department; 41.5% indicated their home state has an agritourism department, and 6.2% indicated their home state did not have an agritourism department.

Respondents were to identify whether or not they had heard certain terms related to agritourism. The most recognized term was "agritourism" (84.8%), followed by "rural tourism" (66.7%). Table 2 identifies additional responses to agritourism terminology.

Table 2

Respondents' Knowledge of Agritourism Terminology (N = 66)

	Yes		No		Don't Know	
Terms	*f*	*P*	*f*	*P*	*f*	*P*
Agritourism	56	84.8	6	9.1	4	6.1
Rural tourism	44	66.7	19	28.8	3	4.5
Farm tourism	41	62.1	19	28.8	6	9.1
Community Supported Agriculture	36	54.5	24	36.4	6	9.1
Eco-tourism	29	43.9	30	45.5	7	10.6
Green tourism	17	25.8	43	65.2	6	9.1

Sources of Agritourism Information

Respondents (n = 65) identified sources of information regarding agritourism information and promotion, and the results are reported in Table 3. Word-of-mouth (81.5%) and paid advertising in local paper, radio or television (70.7%) were the most common previously exposed/observed methods of agritourism promotion.

Table 3

Respondents' Sources of Information about Agritourism (n = 65)

	Yes		No		Don't Know	
Sources of Information	*f*	*P*	*f*	*P*	*f*	*P*
Word-of-mouth	53	81.5	6	9.2	6	9.2
Paid advertising in local paper, radio or television	46	70.7	9	13.8	10	15.4
Web site	42	64.6	12	18.5	11	16.9
Free media relations with local paper, radio or television station	41	63.0	6	9.2	18	27.7
Free media relations within travel magazines (e.g. article in magazine)	36	55.4	11	16.9	18	27.7
Paid advertising with travel magazines	35	53.8	12	18.5	18	27.7
Free advertising relations with local paper, radio or television station	33	50.8	10	15.4	22	33.8
Paid advertising with trade associations	29	44.6	13	20.0	23	35.4
Direct mailing	29	44.6	24	36.9	12	18.5

To determine sources of information respondents (n = 65) identified if specific types of media would be helpful in promoting agritourism (Table 4). The type of media with the highest percentage was Web site (95.4%). Print advertisement was the second most effective type of media to promote agritourism (93.8%). The media types with the lowest percentage were Myspace (50.8%) and wikis (33.8%).

Table 4

Respondents' Source of Information to Look for Specific Information about Agritourism Events (n = 65)

	Yes		No		Don't Know	
Types of Media	*f*	*P*	*f*	*P*	*f*	*P*
Web site	62	95.4	1	1.5	2	3.1
Print advertisement	61	93.8	1	1.5	3	4.6

Television advertisement	59	90.8	1	1.5	5	7.7
Radio advertisement	59	90.8	2	3.1	4	6.2
Facebook	57	87.7	5	7.7	3	4.6
Email	55	84.6	5	7.7	5	7.7
Blogs	42	64.6	11	16.9	12	18.5
Myspace	33	50.8	25	38.5	7	10.8
Wikis	22	33.8	18	27.7	25	38.5

Respondents identified how they (n = 65) had learned about an agritourism event, if previously visiting one. As shown in Table 5 respondents identified that word-of-mouth (69.2%) and friends (63.1%) were the most frequent sources of information about agritourism events. Tourism book and billboards (20.0%) were the two least frequent ways of learning about agritourism events.

Table 5

Respondents' Source of Information to Learn About Agritourism Site (*n = 65*)

	Yes		No	
Source of Information	*f*	*P*	*f*	*P*
Word-of-mouth	45	69.2	20	30.8
Friends	41	63.1	24	36.9
Farm sign	31	47.7	34	52.3
Web site	30	46.2	35	53.8
Newspaper	26	40.0	39	60.0
Farm advertisement on radio	22	33.8	43	66.2
Internet search	22	33.8	43	66.2
Magazine	20	30.8	45	69.2
Billboard	13	20.0	52	80.0
Tourism book	13	20.0	52	80.0

To determine if respondents (n = 65) were to consider visiting an agritourism site or farm, the question was asked where they would look for specific information. As shown in Table 6, Internet search (72.3%) had the highest percentage, followed by local newspaper (30.8%), magazine (24.6%), and yellow pages (9.2%).

Table 6

Respondents' Source of Information to Look for Specific Information about Agritourism Events (n = 65)

	Yes		No	
Source of Information	*f*	*P*	*f*	*P*
Internet search	48	72.3	17	26.2
Local newspaper	20	30.8	45	69.2

Magazine	16	24.6	49	75.4
Yellow pages	6	9.2	59	90.8

Demographics

Respondents were from ten different universities throughout the nation. The highest number of respondents (n = 18) and were from Oklahoma State University, which is where the conference was held (28.1%). The Ohio State University had the second highest amount of students in attendance (9, 14.1%). Tarleton State University had eight (12.5%), Kansas State University had seven (10.9%), Texas Tech University had six (9.4%), and California Polytechnic University--San Luis Obispo, had five (7.8%). The four schools with the lowest percentage of respondents were University of Arkansas with four (6.3%), Missouri State University with three (4.7%), Texas A&M University with two (3.1%), and University of Florida with two (3.1%).

The majority of the respondents (n = 64) were seniors (39.1%), followed by juniors (25.0%), freshmen (18.8%), sophomores (10.9%), and graduate students (6.3%). The highest number of respondents (n = 42) were agricultural communications majors (65.6%). Six (9.4%) were agricultural communications and animal science double majors. Two (3.0%) respondents were agricultural science and agricultural communications double majors, two (3.0%) were agricultural services and development double majors, and two (3.0%) were agricultural science. Single respondents (1.6%) reported double majors in agricultural communications and one of the following: agricultural education, English, poultry science, agricultural business, Spanish, leadership development, advertising, dairy science, agricultural science, and agriculture unknown. Overall, there were 59 respondents who indicated an educational focus in agricultural communication (92.2%).

Respondents identified their home state. The respondents (n = 62) were from 14 different states including: Texas (19.4%), Oklahoma (19.4%), California (12.9%), Ohio (11.3%), Kansas (8.1%), Arkansas (6.5%), Missouri (4.8%), Indiana (3.2%), Florida (3.2%), New Mexico (3.2%), Arizona (1.6%), Maryland (1.6%), Louisiana (1.6%), and Illinois (1.6%). Respondents were also asked to identify the type of community in which they grew-up. The largest percentage (44.8%) of students had grown-up on a farm, while the smallest percentage had grown-up in a rural non-farm (less than 10,000) area (12.7%) or a city (more than 10,000) (12.7%).

The mean respondent age was 20.5 years (SD = 1.6). One half (50%) of the respondents were either 20 or 21 years of age. Of the 63 respondents reporting gender, 47 were female (81.0%) and 16 were male (19.0%). Of the 61 respondents reporting ethnicity, 56 were Caucasian (91.8%). Single respondents (1.6%) reported the following ethnicities: Caucasian and Native American, Native American, Caucasian and Hispanic, Hispanic, and Portuguese.

As shown in Table 7, the last series of demographic questions asked the respondent about their family's involvement in agriculture and agritourism, 95.2% of respondents indicated that their families were involved in agriculture. However, for the majority of respondents (74.6%), farming was not the family's primary source of income. Only three (4.8%) respondents indicated that their family operated an agritourism venue.

Table 7

Respondents' Family Involvement in Agritourism (*n = 63*)

Item	Yes		No		Don't Know	
	f	*P*	*f*	*P*	*f*	*P*
Family involved in agriculture	60	95.2	3	4.8	0	0
Farming family's primary source of income	16	25.4	47	74.6	0	0
Family has an agritourism operation	3	4.8	57	90.5	3	4.8

Conclusions, Discussion, and Implications

Respondents ranked agriculture (*M* = 4.98) and agritourism (*M* = 4.45) as important. The most important perceived agritourism venue was agriculture-related festival(s) or event(s) (*M* = 4.46), followed by pick-your-own produce or fruits and on-farm hunting (*M* = 4.28). Respondents indicated that "agritourism" was the most recognized term (84.8%) in a list of related terminology. Over half of the respondents (52.3%) were unsure if their home state had an agritourism department. Over three-fourths of the respondents (81.5%) indicated hearing about an agritourism event by word-of-mouth. While nearly three-fourths (70.7%) had gained agritourism information by paid advertisements in a local paper, or on the radio or television. Respondents identified types of media that would be effective sources of information and almost all (95.4%) respondents chose Web site and print advertisement (93.8%).

When identifying the source of information where respondents had previously seen/heard an agritourism event promoted, 69.2% noted word-of-mouth and 61.2% from friends. An Internet search was identified by most respondents (72.3%) as the best methods for finding information regarding agritourism. The term agritourism was recognized by most (84.8%) respondents. Research has shown that many terms are employed in the literature to describe tourism activities in rural areas (Roberts & Hall, 2001). With most of the respondents (81.5%) recognizing the term "agritourism," it can be assumed that it is the most recognizable term in rural/farm related tourism.

Almost half of the respondents (47.3%) identified "touring" as a relevant theme in agritourism; therefore, it can be assumed that many view agritourism as a type of tour. McQuail's (2005) Functionalist theory notes that entertainment relates to providing amusement, diversion and the means of relaxation as well as reducing social tension and entertainment was also a primary theme identified. Because agritourism can be entertaining it can be assumed that it is a form of entertainment.

Over half of the respondents (52.3%) reported not knowing if their state had an agritourism department. Research shows that agritourism operations exist in every state, and in many states, organizations, state officials, citizens, and others have undertaken some type of effort to enhance agritourism (Pittman, 2006). It is clear that agritourism is not being promoted to the level of audience saturation. University level courses must focus on agritourism education.

Most respondents (81.5%) noted exposure to agritourism promotion via word-of-mouth; perhaps an indication that many individuals are learning about agritourism events from an acquaintance. The second highest percentage of agritourism exposure was through paid advertisements (70.7%); therefore, it may be possible that participants are reading about agritourism events in these venues and then passing that information along to a friend. Research in Tennessee indicated that of the respondents, 50% or more used word-of-mouth, business sign, a state Web site and newspaper advertisements to advertise their agritourism operations (Jensen et al., 2005). This study follows closely to the Tennessee study.

Respondents noted that direct mailing and paid advertising with trade associations (44.6%) were the least wanted sources of information regarding agritourism. A reason for this may be that many college students do not receive direct mailings or trade magazines. Web sites were identified as the best type of media (95.4%) followed by print advertisement (93.8%). A Tennessee study asked respondents (consisting of current agritourism business owners) to identify marketing and promotion assistance services needed (Bruch & Holland, 2004). The top five identified were; Internet site development, liability and insurance issues, assistance identifying and making tour bus and travel group contacts, market research, and visitor safety analysis. This indicates that agritourism business owners should use a Web site to promote their business.

Respondents indicated that they had learned about agritourism events, previously attended, by word-of-mouth (69.2%) and friends (63.1%). A Pennsylvania study indicated that agritourism operators rated their top five resources for marketing agritourism as word-of-mouth, repeat business, newspaper ads, brochures and Internet/ Web sites; while visitors ranked Internet/ Web sites, information/ welcome centers, brochures, travel books/guides and word-of-mouth as their top sources for finding information about agritourism (Ryan et al., 2006). This study supports and validates these findings. McQuail's theory (2005) focusing on information, consists of providing information about events and facilitating innovation and agricultural communications students and agritourism operators have identified similar resources to promote, provide information, and advertise agritourism.

Respondents identified Internet searches (72.3%) as the most effective tool to use when searching for information regarding agritourism. Research has shown that "students of the millennial generation spend an average of nearly 6.5 hours in front of some type of media each day" (Phipps, Osborne, Dyer, & Ball, 2008, p. 291). Because of this, agritourism Web sites should have effective tags to assist with ease and efficiency of agritourism searches.

The conclusions from this study cannot be generalized back to a broader population, but many conclusions can be drawn. The majority of the respondents were female (81.0%), and most were Caucasian (91.8%). Research indicates that this is often the case with agricultural communications professionals as shown in the study of Agricultural Communicators in Excellence (ACE) members where 58.8% were female and 94.9% were Caucasian (McGovney, 2005). As shown in the literature review Caucasian individuals are 10% more likely to visit a farm than other ethnicities (Carpio et al., 2008). The largest percentage (44.8%) of respondents described the community they grew-up in as a farm. Research has indicated that rural farms are attractive tourist destinations (Brown & Reeder, 2007). If the majority of the respondents were

raised on a farm it may be possible for them to implement agritourism in their family's farming operation to expand, increase or stabilize profitability.

Recommendations for Further Study

McQuail's Functionalist theory shows continuity is about forging and maintaining commonality of values. Many agricultural communications students' were raised on a farm and it can be assumed that they share similar values especially since 95.2% of the respondents have family involved in agriculture (McQuail, 2005). With only 25.4% of the respondents having farming as their family's primary source of income, and 44.8% growing up on a farm it can be assumed that agritourism may be feasible alternative to expand/add to their current operations. Additional research should be focused in this area.

When given six terms related to agritourism, the term agritourism was the most recognized (84.8%). The other term: rural tourism, farm tourism, community supported agriculture, eco-tourism and green tourism all had varying degrees of recognition, but further research would need to be conducted to determine if the phrases should continue to be included in reference to agritourism.

It is recommended that agritourism business owners not promote their operation with direct mailings and paid advertising with trade magazines. Web sites are recommended to represent agritourism operations because 95.4% of respondents felt it would be the most helpful in promoting agritourism. Also, with 72.3% using an Internet search, it is important to create effective Web site keywords to help with searches. Myspace and wikis are not recommended as promotion tools for agritourism. It is also recommended that agritourism venues have an identifiable farm sign because almost half (47.7%) of the respondents had attended an agritourism venue because of advertisement on a farm sign.

Based on the small population of the study, it is recommended that further research be conducted with non-agriculture collegiate students since only 12.7% were from a city with 10,000 or more individuals and 95.2% had family involved in agriculture. The population was also predominately female (81.0%), so a sample group with more males would be another recommendation, as well as, including more than ten universities and a broader range of ethnicities.

Additionally, curriculum should be integrated into collegiate courses. Because Web sites and print media were noted as the most successful means for agritourism promotion, university students (particularly agricultural communications students) should be highly trained in these areas. Also, an agritourism conference would be useful since word-of-mouth had one of the highest means as an effective communications piece. A conference would also enable collegiate students interested in agritourism to gather and gain knowledge as well as share experiences.

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AGRICULTURAL COMMUNICATION STUDENTS' PERCEPTIONS, KNOWLEDGE AND IDENTIFIED SOURCES OF INFORMATION ABOUT AGRITOURISM

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This study was a quantitative descriptive study that assessed agricultural communications college students from 11 universities as to their perceptions, knowledge and information sources with respect to the growing business of agritourism. The authors note that agritourism operations exist in every state, and provide the twin benefit of improving income and economic viability of agricultural operations, as well as building awareness of, and appreciation for, rural life. Perceptions of agritourism have not been previously assessed at the collegiate level, so this study represents an opportunity to develop some baseline data on this topic.

The authors provide a sound theoretical framework and literature review to ground the study. Related literature describes the history, growth and types of agritourism enterprises in the U.S. The conceptual framework focuses on the Lifelong Education Program Planning (LEPP) model and McQuiail's functionalist theory. The LEPP model is used to frame agritourism in the context of program planning, while functionalist theory explains how information, in this case information about agritourism, can be diffused through a social system.

Results show that agricultural communications students rank both agriculture and agritourism as very important, yet are unsure if their home state had an agritourism department. Most hear about agritourism events by word of mouth, followed by repeat business, and newspaper ads. That authors make several recommendations for further study and for practice, including replicating the study with non-agriculture college students and integrating agritourism into collegiate curricula.

Questions:

1. What do you think the results of this study might look like with non-college of agriculture students?
2. Who should be the audience for agricultural awareness programs like agritourism—should we target rural or non-rural audiences?
3. Although agricultural communications students definitely have a connection to agritourism, did you consider expanding your population to include college of agriculture students from other majors? If you did a study like this, what do you think you might find?

Understanding the Intended Outcomes and Impacts of Agricultural Leadership Development Programs

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Introduction

The W. K. Kellogg Foundation developed Agricultural-Based Leadership Programs in the 1960s "to increase the participant's understanding of political, social and economic systems to develop social skills, to be effective spokespeople for their industry or community, to expand individual networks, and to develop future political, civic and organizational leaders" (Howell, Weir, & Cook, 1982). Since then, there have been approximately 40 other programs developed in the United States, Canada and Australia based on the Kellogg Model.

Despite the fact that there are over 40 programs today, few in-depth evaluations have been conducted to determine the impacts these programs have. Therefore, program effectiveness becomes more difficult to determine when the outcomes of these programs are still unknown. Program evaluations have been conducted for many programs on various levels, most of which only measure short and medium-term outcomes (Carter & Rudd, 2000; Kelsey & Wall, 2003; Whent & Leising, 1992). Further evaluation is needed for the programs to better understand the outcomes, including short, medium and long term. Additionally, an evaluation of agricultural-based leadership programs on a national scale has not been conducted in over 20 years, which was based on four of the original Kellogg Model programs in Pennsylvania, California, Michigan and Montana (Howell, Weir, & Cook, 1982). Before understanding what the outcomes

of the programs are, it is important to understand what the expected outcomes are as communicated by the leadership program directors.

Theoretical Framework

The Theory of Planned Behavior was used in this study, specifically focusing on identifying the salient beliefs of the directors. According to the Theory of Planned Behavior, one's behavior is a function of certain salient beliefs to that behavior (Ajzen, 1991). Behavior is guided by three kinds of salient beliefs: behavioral beliefs, normative beliefs and control beliefs. Behavioral beliefs are the beliefs about expected outcomes produced from a targeted behavior. Normative beliefs are the beliefs about normative expectations of important individuals or groups in regards to a targeted behavior. Control beliefs are the beliefs concerned with the potential factors that may facilitate or impede the performance of the targeted behavior (Ajzen, 1991). The behavioral beliefs are assumed to produce a favorable or unfavorable attitude toward the behavior. Normative beliefs result in subjective norm or perceived social pressure; and control beliefs determine perceived behavioral control. The three variables, attitude toward the behavior, subjective norms and perceived behavioral control, predict the behavioral intention of an individual (Ajzen, 1991).

Methodology

This study used one focus group with 24 participants comprised of directors of agricultural and rural leadership development programs internationally with a wide range of experiences within the programs. The moderator used a guide to question the participants about what the outcomes and impacts of the agricultural leadership programs are. The focus group was transcribed and analyzed using Krueger and Casey's (2000) rapid analysis approach.

Results

Three major themes emerged from the directors concerning their beliefs on what the outcomes and impacts are of agricultural leadership programs: 1) improved social skills, 2) development of networks and 3) increased understanding and acceptance.

The participants reported stated many characteristics and examples of improved social skills such as increased communication skills both verbally and written, better negotiation skills, and "enhanced communication proficiencies." The participants also stated a creation and use of networks as an outcome of agricultural leadership programs. "We're creating networks of leaders that can work together with each other and draw upon each other," stated one participant.

The participants continually identified understanding and acceptance of the issues and varying opinions as an outcome. This understanding and acceptance is in regards to agricultural and political issues as well as cultures, economics, and leadership. The participants provided examples of this understanding and acceptance as "being politically astute and understanding the importance of compromise" and as an "enhanced awareness of diversity issues." Other outcomes identified included increased confidence and more empowered leaders.

Conclusions

The outcomes as identified by the participants are consistent with many of the outcomes identified in previous research (Carter & Rudd, 2000; Kelsey & Wall, 2003; Whent & Leising, 1992). Many of these outcomes are short and medium term outcomes rather than long-term outcomes and impacts. Improved social skills, development of networks and an increased understanding and acceptance were the primary outcomes identified or "salient beliefs" of the focus group participants that potentially lead to the intended behavioral changes of leadership program participants.

Recommendations

Understanding what the intended outcomes and impacts of agricultural leadership programs are will help to evaluate these outcomes through the program alumni. Additional research with the directors of agricultural leadership programs should be conducted to identify more long-term outcomes and impacts. A majority of the outcomes identified were directly related to the alumni of the programs. An evaluation of how alumni are using the skills, networks and knowledge gained is important to be able to communicate to outside sponsors of leadership programs to continue to gain funding and the resources needed for these leadership programs.

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Using Mathematics Enrichment Activities in Preparation for the Agricultural Mechanics CDE

Introduction

Agricultural education can provide a model for the integration of mathematics, science and engineering concepts in a real-world context. An emphasis on contextual curriculum has been shown to improve various aspects of student learning by enhancing the connection between subject matter content and real life (National Research Council, 1996). Secondary agricultural mechanics instruction is designed to develop an understanding of the applications of mathematics, reinforce mathematics through situated learning, and provide instruction in employability and entrepreneurial skills through such a context (Shinn, 1998). Johnson (1991) previously demonstrated the efficacy of linking agricultural mechanics instruction to real-world mathematics contexts.

Career development events provide a competitive opportunity for the application of principles of science, technology and mathematics (STEM) to everyday situations. Curriculum leaders emphasize the importance of incorporating real-world applications in teaching secondary mathematics and science (National Council for Teachers of Mathematics, 1989). The State Agricultural Mechanics CDE is a contextual learning situation anchored in an authentic scenario.

Purpose and Research Objective

The purpose of this study was to investigate the effect of enrichment activities in contextual settings on the performance of selected groups of students. The objective was to compare CDE Contest outcomes; the Written Examination, Team Individual Skill scores, and Team Activity scores between teams exposed to mathematics enrichment activities and those that were not.

Methodology

The study employed a causal-comparative quasi-experimental design (Gall, Gall & Borg, 2003). Subjects were selectively exposed to a treatment, but were neither randomly selected nor assigned to the treatment group. The data sources used to provide information for this study; results from subjects' participation in the State Agricultural Mechanics CDE. Scores information for the three separate data components; Written Exam Scores, Individual Skill Scores, and Team Activity Scores was obtained from the Judgingcard.com web site.

The target audience was composed of students enrolled in power, structural and technical systems courses in secondary schools in Texas. The competitive selection process for the Agricultural Mechanics CDE was used to select the sample, preventing the random assignment of subjects to treatment groups. Schools competing in the 2007 State CDE were given the opportunity to participate in the enrichment activity sessions.

Students who received enrichment activities in contextual mathematics served as the experimental treatment group. Students in 16 schools not provided enrichment activities served

as the control group. Twenty-nine schools and 109 students competed in the 2008 Agricultural Mechanics CDE. Thirteen schools who participated in enrichment sessions qualified to compete in the 2008 State Agricultural Mechanics CDE.

Institutional Review Board requirements were met. During the treatment sessions, participants and teachers were given student and parental permission release forms, and asked to bring the signed forms to the State Agricultural Mechanics CDE. Completed forms were collected during the examination component of the CDE.

Findings

The findings suggest that enrichment activities do improve individual and team performance on the Agricultural Mechanics Career Development Event.

The difference in Written Examination scores between cooperators and non-cooperators by team would be 36.96 (12.32 X 3). The difference in the average Total CDE Score between cooperators and non-cooperators by Team was found to be 52.25. The Written Examination score accounted for 71% (36.967.11 / 52.26) of the variability in Total CDE score by Team. Cooperation status had a large effect on 2008 Written Examination Score. Cooperating teams scored 12.32 points higher than non-cooperating teams; a score increase generally adequate to change the outcome of most career development events.

Cooperation status had a large effect on 2008 Team Total CDE Score. The mean total numeric score of cooperating teams was 420.38, 52 points above the mean of non-cooperating teams. The mathematics enrichment improved the total numeric scores of cooperating teams by an average of 52.25 points per team, or 17 points per individual.

Cooperation status had a large effect on 2008 Team CDE Rank. Participating in the contextual mathematics enrichment improved their team rankings by an average of 8 places.

Recommendations

Consideration should be given to replication of this study at a national level with various other career development events. Contextual problems appropriate for multiple disciplines can be developed and tested. Involving other CTSOs could prove beneficial (Zirkle & Connors, 2003).

Consideration should be given to replication of this study with a greater focus on diversity. A related study found that contextual mathematics problems incorporated into AFNR classroom instruction did provide a slight increase in student achievement for some ethnic groups (Jasek, 2005). Efforts should be made to identify states where greater ethnic and gender diversity is represented in the participants of the agricultural mechanics CDE.

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WHAT IS AGRICULTURE?: GRADUATE STUDENTS' KNOWLEDGE OF AGRICULTURE

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Introduction

Today, many Americans perceive agriculture is nothing more than farmers growing crops and ranchers raising animals for food (National Research Council, 1988; National Research Council, 2009). Since the beginning of the industrial revolution, people have been moving from rural towns to urban cities. "Urbanization of the population of the United States has contributed to inaccurate perceptions and low awareness about agriculture" (Terry & Lawver, 1995, p. 64); because of this, many Americans have a disconnect with the agricultural industry. One disadvantage of this disconnect is they fail to see the significance, both economically and socially, it has on this country and the links to human health and environmental quality (National Research Council, 1988). A reason that they fail to see the significance of agriculture could be that Americans do not have to worry about nature of our agricultural industry. In the United States, American people can buy agricultural products that are high in quality and low in cost (Terry, 1990).

The purpose of this study was to determine the level of knowledge of graduate students. The objective of this study was to identify the knowledge level of graduate students.

Theoretical Frameworks

In 1988, the National Research Council developed the idea of agricultural literacy. The council stated "an agriculturally literate person's understanding of the food and fiber system would include its history and its current economic, social, and environmental significance to all Americans" (National Research Council, 1988, pp. 8-9). As society progresses into the 21st century, the definition of agriculture "is much broader, encompassing a range of natural and social science disciplines" (National Research Council, 2009, p.1.1). To keep up with the changing face of agriculture "college and universities will have to change to advance education and scholarship in agriculture, agribusiness, and natural resources effectively and to foster enhance public literacy about these issues" (National Research Council, 2009, p. 1.5).

Methodology

The population of this study consisted of current graduate students from a southern land grant university from the Agricultural Leadership, Education, and Communication department (N=180). A web based questionnaire was sent out via email to all graduate students in the department. The questionnaire was developed using Survey Monkey. The questionnaire consisted of 40 true/false, sure/not sure knowledge questions based on a previous study condcted by Flood (1993). The questionnaires were given to a panel of experts to check for face and content validity. The Cronbach's alpha for this instrument was .69. Questionnaires were delivered using the *Tailored Design Method* (Dillman, 2007). A prenotice email was sent 3 days prior to the delivery of the questionnaire. The questionnaire was then emailed out to the population. A thank you email was sent to all respondents. After five days, a reminder email was sent out to non-respondents to respond to the questionnaire by Friday at 5pm. Fifty –five graduate students responded to the questionnaire, yielding a 31% response rate. The questionnaires from respondents that had not correctly filled out the 40 knowledge questions were taken out, leaving forty-two questionnaires. Early and late respondents were compared and no significant differences were found. Research data were entered and analyzed using the Statistical Package for the Social Science version 16.0 (SPSS 16.0). The researcher used frequency and percent to describe the research objective.

Results/Findings

Table 1 represents the questions where a majority of the responses were incorrect and sure. The remainder of the questions from the questionnaire had a majority of correct/sure or correct/not sure responses. These included: Bovine Spongiform Encephalopathy, or Mad Cow Disease, is a neurological disease that affects sheep, Texas' primary fiber crop is cotton, Angus is a breed of cattle raised for its marbling abilities, and The Texas AgriLife Extension Service is a group of volunteers that exclusively help farmers.

Conclusions

	Correct Sure		Correct Not Sure		Incorrect Not Sure		Incorrect Sure	
Question:	*f*	%	*f*	%	*f*	%	*f*	%
There are more farms is Texas Today than there were ten years ago.	2	4.8	3	7.1	12	28.6	25	59.5
A plow is an agricultural implement used to plant seeds in narrow rows.	18	42.9	3	7.1	6	14.3	15	35.7
Homogenization kills bacteria in milk with heat.	12	28.6	4	9.5	9	21.4	17	40.5
Salmonella is virus that can cause food borne illnesses.	6	14.3	4	9.5	2	4.8	30	71.4

Table 1

Frequency and Percent of Responses to Agriculture Knowledge Questions (n=42)

According to the frequency and percent scores, a majority of the graduate students questioned have a basic knowledge of agriculture. However, on all of the questions there were some respondents who answered incorrect/sure and incorrect/not sure. According to the literature, the National Research Council recommended that all people be agricultural literate. This data indicates that we are moving in that direction. This data would suggest that college and universities have made changes to the curriculum to keep up with the changing face of agriculture.

Recommendations/Implications

Further research could be conducted to break down the questions into constructs (i.e. plant science, animal science, food safety, Texas agriculture, etc.) to determine where these individuals lack knowledge. Questions also need to be included to identify respondents' sources where of information about agriculture. If students in a department of agriculture leadership,

education, and communication lack knowledge about agriculture, how are we fairing with the general public? Additional research is needed to determine if a disconnect exists.

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WHAT IS AGRICULTURE?: GRADUATE STUDENTS' OPINIONS OF AGRICULTURE

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Introduction

Today, many Americans perceive agriculture is nothing more than farmers growing crops and ranchers raising animals for food (National Research Council, 1988; National Research Council, 2009). Since the beginning of the industrial revolution, people have been moving from rural towns to urban cities. "Urbanization of the population of the United States has contributed to inaccurate perceptions and low awareness about agriculture" (Terry & Lawver, 1995, p. 64); because of this, many Americans have a disconnect with the agricultural industry. One disadvantage of this disconnect is they fail to see the significance, both economically and socially, it has on this country and the links to human health and environmental quality (National Research Council, 1988). A reason that they fail to see the significance of agriculture could be that Americans do not have to worry about nature of our agricultural industry. In the United States, American people can buy agricultural products that are high in quality and low in cost (Terry, 1990).

The purpose of this study was to determine the opinions of agriculture of graduate students. The objective of this study was to identify the opinions of agriculture of graduate students.

Theoretical Frameworks

In 1988, the National Research Council developed the idea of agricultural literacy. The council stated "an agriculturally literate person's understanding of the food and fiber system would include its history and its current economic, social, and environmental significance to all Americans" (National Research Council, 1988, pp. 8-9). As society progresses into the 21st century, the definition of agriculture "is much broader, encompassing a range of natural and social science disciplines" (National Research Council, 2009, p.1.1). To keep up with the changing face of agriculture "college and universities will have to change to advance education and scholarship in agriculture, agribusiness, and natural resources effectively and to foster enhance public literacy about these issues" (National Research Council, 2009, p. 1.5).

Methodology

The population of this study consisted of current graduate students from a southern land grant university from the Agricultural Leadership, Education, and Communication department (N=180). A web based questionnaire was sent out via email to all graduate students in the department. The questionnaire was developed using Survey Monkey. The questionnaire consisted of 39 five point Likert scale questions (1= Strongly Disagree; 5= Strongly Agree). The questions were based on a previous study conducted by Flood (1993). The questionnaires were given to a panel of experts to check for face and content validity. The Cronbach's alpha for this instrument was .73. Questionnaires were delivered using the *Tailored Design Method* (Dillman, 2007). A prenotice email was sent 3 days prior to the delivery of the questionnaire. The questionnaire was then emailed out to the population. A thank you email was sent to all respondents. After five days, a reminder email was sent out to non-respondents to respond to the questionnaire by Friday at 5pm. Fifty –five graduate students responded to the questionnaire, yielding a 31% response rate. Early and late respondents were compared and no significant differences were found. Research data were entered and analyzed using the Statistical Package for the Social Science version 16.0 (SPSS 16.0). The researcher used mean and standard deviation to describe the research objective.

Table 1

Mean Score and Standard Deviation of Responses by Graduate Students on Perception Questions (n=55)

Results/Findings

Table 1 represents the top and bottom four mean score statements. The statements that are asterisked were reversed coded to aid in interpretation. There were eleven statements that were reverse coded. Eleven statements have a range of a mean score of 4.77-4.00 and a standard deviation score of .1.21-.67. Twenty-one statements have a mean score of 3.98-3.02 and a standard deviation of 1.58-.80. Four statements have a mean score of 2.73-2.00 and a standard deviation of 1.21-.79. Three statements have a mean score of 1.96-1.73 and a standard deviation of 1.09-.83.

Statements:	*M*	*SD*
Water, soil, and minerals are important in agriculture.	4.77	.78
*Farmers earn too much money.	4.65	.67
The United States needs a steady supply of food and fiber products to remain strong.	4.46	.80
*Pollution of soil is not as important as air or water pollution.	4.35	1.02
*Chemicals banned in the United States enter this country on imported food products.	2.00	.80
*Animals have the same rights as people.	1.96	1.09
Local public policy has little effect on farmers.	1.77	.83
Soil erosion does not pollute Texas' rivers and lakes.	1.73	.94

Note. Scale: 1= Strongly Disagree; 2=Disagree; 3= Neither Agree or Disagree; 4= Agree; 5= Strongly Agree

Conclusions

Participants posted higher mean scores on issues related to soil and water importance and pollution as well as economic issues related to production agriculture. Lower mean scores were earned in the areas of animal rights, public policy, and soil erosion. Does this mean that students are more in tune with environmental issues and the economy? Do the students lack understanding or are they apathetic to animals' rights and public policy? If students are more agricultural literate, will their opinion of agriculture change?

Recommendations/Implications

Further research could be conducted to compare the knowledge level of agriculture and the opinion a person has of agriculture. If students in a department of agriculture leadership, education, and communication have a negative opinion about agriculture, how are we fairing with the general public? Additional research is needed to identify respondents' sources where of information about agriculture and if this influences their opinion of agriculture.

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Research Poster Proposal
for
2010 Southern Region Conference of the
American Association for Agricultural Education

What is the Role for Agricultural Education in Interdisciplinary Leadership Education Programs?

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Introduction

Surveys conducted by Harvard University's Center for Public Leadership indicate that 80% of Americans agree or strongly agree that "we have a leadership crisis in the country today" (Rosenthal, et al., 2008, p. 3). Furthermore, 79% of Americans agree or strongly agree that "unless we get better leaders, the United States will decline as a nation" (Rosenthal, et al., p. 3) Among 13 different occupational sectors, the only two in which Americans have more than a moderate amount of confidence are military and medical (Rosenthal, et al.).

America must face this challenge through education to develop and equip future generations of leaders (Herman, 2007; Hesselbein, 2009). In line with this challenge, the National Research Agenda for Agricultural Education and Communication identified a research priority to "develop and disseminate effective leadership education programs" (Osborne, n.d., p. 5). While the role with agricultural groups may be apparent, the opportunities for involvement in interdisciplinary leadership education require further exploration.

Conceptual & Theoretical Framework

According to Fritz and colleagues (2003), "a niche in collegiate leadership education exists within departments of agricultural education" (p. 18). An analysis of leadership offerings in collegiate agricultural education departments revealed that the leadership courses in such departments were often serving non-agriculture students at the undergraduate level but not at the graduate level. Leadership education at the graduate level appears to be "a market for all leadership educators" (Fritz, et al., 2003, p. 21).

Adult learning theory emphasizes the importance of engaging learners in all aspects of the planning and implementation of their learning experiences (Knowles, Holton, & Swanson, 2005). Accordingly, in an educational approach to address America's leadership crisis we must first engage the prospective learners to identify their educational needs and interests. In this situation, we need to know more about the leadership education interests of graduate students in institutions with departments of agricultural education.

Methodology

The researcher prepared an online survey to be administered through SurveyMonkey, an Online survey software designed "to enable anyone to create professional online surveys quickly and easily" (SurveyMonkey.com, n.d.). The researcher prepared an initial draft of the survey based on knowledge from the literature and then solicited feedback and input from other leadership educators through a related professional association. Comments from those colleagues were used to make improvements in the final draft of the survey. Questions in the final draft of the survey focused on perceptions of leadership, experience with leadership courses, and areas of interest in leadership education.

The population for the study included current graduate students (from all disciplines) at a land-grant institution with a department of agricultural education. The researcher obtained a convenience sample by advertising the survey through two email listservs. The first listserv was through the institution's Graduate School and was designed to reach the 4,000+ graduate students at the institution's main campus. The second listserv was through the institution's Graduate Student Assembly and was designed to reach students who represent each of the institution's 60+ areas of graduate study. With both listservs, the potential existed for the messages to be forward further. In the end, 136 graduate students participated in the survey. All of the institution's individual colleges were represented, with the largest representation (31.6%, n=43) from the college of liberal arts and sciences. Only 12.5% (n=17) of responses were from students enrolled in programs within the institution's college of agriculture. Because this was a convenience sample, the findings cannot be generalized to nonrepondents, but they can provide important insights for leadership educators

Findings

When asked to agree or disagree with the statement "people are born as leaders," responses suggested uncertainty, with more than one-third of respondents (34.1%, n=47) selecting "neither agree nor disagree" from the five-point Liker-type scale. However, when responding to the statement "academic grounding in leadership is important for people in leadership positions," the majority of respondents (51.1%, n=70), indicated "agree" or "strongly agree." Less than one-fourth indicated "disagree" (23.4%, n=32) or "strongly disagree" (1.5%, n=2).

Less than one-fifth of study participants had completed a graduate-level course that emphasized leadership theory or practice. When asked "What has kept you from completing graduate-level leadership courses?", the majority of students (56.7%, n=68) responded "I don't know about them." While 40.0% (n=48) of participants indicated that they cannot fit leadership courses in their current plan of study, 73.1% (n=95) of participants indicated they would be interested in pursuing a graduate certificate program that emphasizes leadership theory and practice.

Among those who expressed interest in a graduate certificate program, the leadership contexts of most interest included "community" and "educational," both being identified as leadership interest areas by 68.4% (n=65) of survey participants. The other leadership context interests identified in the survey instrument included "corporate" (47.4%, n=45), "not-for-profit" (44.2%, n=42), "political" (38.9%, n=37), "youth" (31.6%, n=30), and "military" (11.6%, n=11).

Conclusions

Based on the graduate students' interest in leadership education, combined with their limited experience with leadership courses, leadership education at the graduate level appears to be a market for additional course offerings and programs in leadership education. The leadership contexts of most interest to study participants, "community" and "educational," are both potential areas of expertise for departments of agricultural education.

Implications & Recommendations

While graduate students within the colleges of agriculture may be aware of the potential for departments of agricultural education to meet their leadership education interests and needs, this study suggests that many graduate students outside of the college of agriculture are also a potential market. While youth leadership has been a traditional focus for agricultural education departments, such departments should consider additional course offerings and programs that prepare graduate students to be leaders in both community and educational contexts. In some institutions, a graduate certificate in leadership studies may allow agricultural education departments to expand and promote their leadership education offerings to a wider audience and thus do more to combat America's leadership crisis.

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Georgia Middle School Principals' Familiarity with Middle School Agricultural Education Programs

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Introduction

This study examined Georgia middle school principles' familiarity agricultural education programs; little research exists on principals' familiarity of middle school agricultural education. With research showing that standardized test scores are higher in schools with agricultural education programs, principal perception of agricultural education should be positive. Without research showing principal's familiarity, then administrative support of middle school agricultural education is unknown.

As a principal, I believe…		Mean
1.	the Agricultural Education program is an important part of the community.	3.6
2.	there are a number of Ag Ed events, other than FFA activities, outside of the classroom and laboratory that are co-curricular, such as field trips.	3.4
3.	the middle school Agricultural Education program places enough emphasis on actual classroom teaching.	3.5
4.	the middle school Agricultural Education program provides equal opportunities for all middle school students.	3.6
5.	I place as much interest on the Agricultural Education program as I do other programs.	3.3
6.	I know what a SAEP (Supervised Agricultural Experience Program) is.	2.9
7.	know what a CDE (Career Development Event) is.	3.0
8.	know the duties of a FFA advisor.	3.3
9.	know the duties of an Agricultural Education teacher.	3.5

Conclusions

As a group the principals seemed to be familiar with Agricultural Education. Not as many knew the actual duties of an FFA advisor or recognized the integral parts of the Agricultural Education program but most felt that Agricultural Education programs were important to the school and community.

Implications

1. An effort should be made to educate Georgia middle school principals with Agricultural Education programs at their school on the duties of a FFA advisor and the integral parts of Agricultural Education.

2. An effort should be made to educate Georgia middle school principals with Agricultural Education programs at their school about the benefits of Agricultural Education.

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A Comparison of Ethnicities in Perception and Behavior of Food Safety Practices in the Home

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Abstract

A national sample of food purchasers, and preparers completed an online survey in 2009 to the determine extent of their perception, and behaviors related to safe food practices in the home. There were a sample size of 413 respondents, 67.1% were female, and 32.9% male, ages from 65 to 18 years old. Among several characteristics, researchers identified household status, income, employment status, and type of area of residence. A descriptive needs assessment using Hershkowitz (1973) matrix analysis were used to identify level of needs for an educational program geared toward five constructs ,and a comparison of ethnicities were conducted. Results indicated low level needs for Caucasian and Minorities were adequate cooking, and avoiding foods from unsafe sources (constructs 4 and 5). No critical needs were identified for either group. Analysis which considered all ethnic groups revealed a critical need. Within the constructs several items were identified as areas for possible re-examination of re-entrenchment of educational materials. Results of this study can provide valuable information in terms of future considerations for educational materials development related to food handling.

Introduction

The Economic Research Service (ERS) has estimated 6.9 billion dollars per year are spent on food-borne illnesses while Centers for Disease Control (CDC) has estimated there are 76 million cases of food-borne illnesses annually, 325,000 hospitalizations and 5,000 deaths. These numbers bring to the forefront an overwhelming importance of prevention. According to Abbot, Bryd-Bredbenner, Schaffner , Bruhn, Blalock (2009) many persons may have perceived an outside organization as typically responsible for food-borne illnesses however, evidence has also suggested some blame stems from consumer's preferences (Patil S, Cates S, Morales, R.,2005) as well as, unsafe behaviors or practices within the household (Medeiros L, Hillers V, Kendall P, Mason, A. ,2001).

According to the National Restaurant Association, in professional settings there is evidence cultural differences can influence how people view food safety (ServSafe Coursebook, 2008). Thus, the researchers found it necessary to examine how demographics relate to food safety perceptions and practices. The National Research Agenda for AAAE (Osborne, 2007) indicated a research priority area within Agricultural Education in Domestic, and International Settings: Extension and Outreach is to ascertain the public's knowledge, views and openness

regarding the agri-food and natural resource system. This research falls within that goal. Additionally, Cummins (1986) made an argument for incorporation of culture, and language in educational programs as significant predictors of academic success. Similarly, it is believed incorporation of ethnic minority persons' culture, and language in career intervention programs will foster career development. Sarancho and Martinez-Hancok (2004) made a successful argument for the type of teacher-education curricula that develop —"cultural sensitivity, and a set of methods as well as techniques that can be applied to a variety of cultures" (p. 265). Furthermore, Sarancho and Martinez-Hancok (2004) made an argument of differences among Hispanic sub-groups and educational needs/experiences. Lopez-Quintero, Crum, and Neumark, (2006) discussed the importance of health related educational materials geared toward patients of all ethnic backgrounds, and considered Hispanic subgroups. The creation of better designed educational materials could better communicate risks involved in consumption of risky foods,and lead to a more informed consumer along with reduction of related food-borne illnesses.

Conceptual Framework

Ramirez and De la Cruz (2003) concluded more than one in eight people in the United States are of Hispanic origin. In 2002, 40.2 percent (or 15 million) of the Hispanic population in the United States were foreign born, meaning 2 in 5 Hispanics are foreign born (Ramirez, de la Cruz,2003). Among the foreign-born Hispanic population in 2002, 52.1 percent entered the United States between 1990, and 2002, another 25.6 percent came in the 1980s, and the remainder (22.3 percent) entered before 1980 (Ramirez, de la Cruz, 2003). The next census will be conducted in April 2010. As the Census indicated, there is a changing demographic population makeup with some consistent trends in persons residing, and working in the United States. Mexican-Americans outnumber all other Hispanic sub-populations residing in the United States. Other Hispanic sub-populations educational attainment of a high school education is greater than Mexican Americans-this group is least likely to have obtained a high school education (Ramirez, de la Cruz, 2003).

While there are studies that have attempted to examine food safety handling on a basis of ethnic differences some have concluded-there are no differences among behaviors while others have shown-there are differences in what various ethnic groups will eat (for instance, beef and unpasteurized milk) (Shiferaw , Cieslak , The Food Group, Yang, Angulo, 2000; Patil (2005); Lin, C. J. (1995)). "As cited by Patil (2005) further research is needed on socioeconomic factors, and other population characteristics that could explain differences in safe handling practices, and risky food consumption habits by demographic categories as identified in this analysis." (p. 1893) and "furthermore in being aware of these differences can assist for better targeting risk communication efforts."

Medeiros L, Hillers V, Kendall P, Mason, A. (2001) pointed out food safety education is most likely to be effective if messages are directed toward a specific audience. An example as stated by Medeiros et al. (2001) is —"the incidence of campylobacteriosis being high among young men, and it has been postulated that the high incidence of *Campylobacter* infections in young men may be a reflection of their poor food preparation skills", (p.111). To reduce this risk, food safety education for young men should include information about cooking poultry completely, and how to avoid cross-contamination during preparation of poultry products

(Medeiros et al., 2001). Medeiros et al. (2001) mention —"Older people are more likely to consume raw or undercooked eggs than they are to partake in any other risky food related behaviors", (p.111). *Salmonella enteridtidis* infections are severe for the elderly, and this infection can be attributed to undercooked eggs (Medeiros et al., 2001). By comparison to adults children have a higher risk of serious complications, and infections from *Escherichia coli* O157:H7. This brings forth a need to address food education directed at parents of young children and childcare providers (Medeiros et al., 2001). Individuals residing in metropolitan areas reported higher consumption of raw or undercooked ground beef than did those in nonmetropolitan areas (Patil et al., 2005)

Numerous sources have stated that young adults often engage in unsafe food handling practices (Unklesbay et al., 1998; Bowman, 1999; Morrone and Rathbun, 2003; Haapala and Probart, 2004; McArthur et al., 2007; Abbot, et al., 2009), and this sub-population lacks vital food safety knowledge (Unklesbay et al., 1998; Endres et al., 2001; McArthur et al., 2007; Abbot, et al., 2009). With the exception of proper cooking, and heating, young adults had the poorest safe handling practices and were least knowledgeable about such practices (Patil, et al., 2005). Additionally, young adults believed it is not necessarily their primary responsibility to ensure food safety–rather responsibility falls on external organizations such as, health departments and restaurants (Abbot, et al., 2009; p.577).

Consumers in the high income (≥ $50,000) category had more widespread consumption of raw or undercooked ground beef, and shellfish compared with low (<$15,000), and middle ($15,000-$49,999) income groups (Patil, et al., 2005). Individuals with high incomes also were least knowledgeable about good hygiene practices, and practices to prevent cross-contamination (Patil, et al., 2005). Persons without a high school education reported lowest consumption of raw/undercooked beef, and shell fish, and reported safer handling practices compared to those with a high school education or more (Patil, et al., 2005).Yet, persons without high school had the least amount of knowledge of safe food handling practices (Patil, et al., 2005). Individuals with less than a high school education reported lower consumption of raw/undercooked beef, and shell fish than did individuals with a high school education or more. Individuals residing in metropolitan areas reported higher consumption of raw or undercooked ground beef than did those in nonmetropolitan areas.

While differences for behaviors among ethnicity were most apparent for consumption of raw or undercooked foods- African Americans reported lowest consumption of raw or undercooked foods, and Hispanics reported highest consumption of raw milk (Patil, et al., 2005). Mid-age adults consumed more raw or undercooked foods (except milk) than young adults and seniors (Patil, et al., 2005).

A majority of participants perceived foodborne illnesses were caused by food prepared from outside their home (Medeiros et al., 2001). However, evidence suggests from food preparation, 25% of reported outbreaks are due to inappropriate consumer food-handling, and preparation practices within the home (Anderson et al., 2004). These practices within the home are likely to contribute to food-borne illnesses (Anderson et al., 2004). The authors pointed out this 25% may be an inadequate estimate since many persons may not report food-borne illnesses derived from within their home nor can they properly recognize symptom(s) of a food-borne

illness (Anderson et al., 2004).

Purpose

Medeiros et al. (2001) study tested the knowledge of participants within the five constructs where as, the researcher's present study in 2009 considered knowledge, perceptions, sub-cultural groups, and program evaluation of needs of the curriculum. The purpose of this research conducted in 2009 was to closely examine potential cultural differences to include Hispanic sub-groups along with perceptions and behaviors of participants. In thesis research conducted at Texas Tech University, it is evidenced that food handling, and food processing practices within Mexico are different in comparison to the United States (Woolley, 2009). This may be due to lack of Hazard Analysis Critical Control Point (HACCP) certification or an unwillingness to adopt new practices that are contrary to Mexican culture. Individuals from Mexico or those individuals with close family ties in Mexico may be more likely to handle food in ways similar to their cultural upbringing.

Objectives

Medeiros et al. (2001) recommended five behavioral constructs to be addressed for food safety educational materials. These are similar to Centers for Disease Control risk factors: personal hygiene, adequate cooking, avoiding cross-contamination, cold-storage/hot holding, and avoiding foods from unsafe sources. Based on the Medeiros et al. (2001) constructs, and findings along with the literature review conducted for this current study of 2009-the researchers arrived at the following objectives to be considered for this study:

- Objective 1: Determine food handling practices based on demographic characteristics.
- Objective 2: Perceptions of safe food handling practices based on demographic characteristics.
- Objective 3: Determine critical needs of minority versus majority group.
- Objective 4: Determine relationships between critical needs of demographic groups.

Methodology

All data were collected in 2009. The research design for this study was a descriptive needs assessment using the Hershkowitz (1973) matrix analysis. Each question was plotted, and was used to determine the level of need of an educational program based on ethnicity. First, grand means for behavior, and perception were calculated for each ethnic group (all vs. Caucasians, vs. minorities) considering all five constructs simultaneously. Then, grand means for behavior, and perception with respect to each of the five constructs: personal hygiene, adequate cooking, avoiding cross-contamination, cold-storage/hot holding, and avoiding foods from unsafe sources were calculated. In all cases grand means were plotted as a horizontal, and vertical line on a —"X" and —"Y" axis of a graph resulting in four quadrants (see Figure 1). The four quadrants represent: Quadrant 1: Critical Need (CN) (high levels of behavior, and low levels of perception), Quadrant 2: Low Level Need (LLN) (low levels of behavior and perception), Quadrant 3: Low Level Successful Program (LLSP) (low levels of behavior and high levels of

perception), Quadrant 4: Successful Program (SP) (high levels of behavior and perception). The grand means were used as a base for comparison and defining where each quadrant was located. Each (X, Y) coordinate corresponded to each construct (Figures 2-4) while in Figures 5-9 refers to a specific subset question located in a construct. The location of each coordinate within a specific quadrant was an indicator of the type of program need (e.g. Quadrant 1: Critical Need (CN) (high levels of behavior and low levels of perception)).

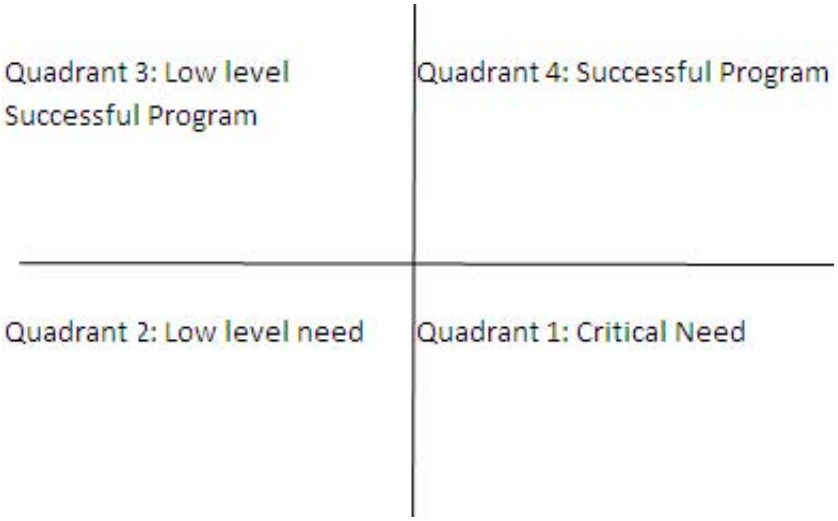

Figure 1. Matrix Analysis Quadrants- Hershkowitz (1973)

The four quadrants represent: Quadrant 1: Critical Need (CN) (high levels of behavior and low levels of perception, Quadrant 2: Low Level Need (LLN) (low levels of behavior and perception), Quadrant 3: Low Level Successful Program (LLSP) (low levels of behavior and high levels of perception), Quadrant 4: Successful Program (SP) (high levels of behavior and perception). The grand means are used as a base for comparison, and defining where each quadrant is located.

Population and Sample/Data Collection

The target population for this study was U.S. primary household grocery buyers. Researchers contracted with a third-party survey research company to perform data collection using their database of professional respondents. Target respondents were identified as a nationally representative sample of primary food purchasers and preparers for the household. Participants had to meet both requirements to be included. The instrument was provided to the survey company after pilot testing was conducted by the researchers nearly a month in advance from the official study. The third party company utilized its selected participants, and conducted the survey through the internet.

Instrumentation

The instrument used for this study was based on Medeiros et al. (2001). This instrument was adapted for use to gauge both perception and behavior. A pilot study was conducted and reliability coefficients were calculated on each of the five construct areas. Reliability was calculated following a pilot test consisting of 27 individuals. The calculation of reliability was performed using the coefficient alpha within SPSS. The Cronbach's Alpha for each construct was .87 for perception and .88 for behavior.

Data Analysis

All data that were collected were in Microsoft Excel and then transferred/evaluated in SPSS (version 16.0). Demographic information was found in a separate sub-section of the survey. For interval variables, the mean, and standard deviation were calculated. These included age, and all questions related to the five constructs. Frequencies were calculated on categorical variables. These included: gender, ethnicity, if a participant was the main meal planner of the household, type of residence(rural area-large city(>500,000 people), year born, if they were a citizen of the U.S., what their household status was (single adult-couple with /out children), employment status, highest level of education, number of hours worked outside the home, and estimated household income. Data for all five constructs, pertaining to perceptions, and behavior of food handling, were evaluated by calculating grand means (perception items plotted on the —"X" axis while behavior items plotted on —"Y" axis) and item means. Each question was plotted, and matrix analysis developed by Hershkowitz (1973) was used to determine level of need of an educational program geared toward specific constructs, and all groups vs. Caucasians vs. minorities.

Findings

In accordance with Krejcie and Morgan's (1970) sample size table, the survey company was asked to provide 386 respondents but actually received data from 413. Non-response was not considered a threat to external validity. The majority of the sample was Caucasian (83.5%) with the remainder of the ethnicities African American (4.1%), Asian American (4.6%), Native American (.2%), Other Non Hispanic (2.4%), and Hispanic (5%). The entire sample consisted of n=413 participants- 67.1% were female and 32.9% male. Frequencies were calculated on categorical variables. These included: gender, ethnicity, 84% of participants were main meal planners of the household while 16% were not.17.7% classified their place of residence as a rural area, 11.6% a town (500-2,500 people), 19.1% a large town (2,501-25,000 people),18.2% a small city (25,001-100,000 people), and 18.2% a large city (>500,000 people). The top 6 states of residence were: CA (19.6%), TX (8.5%), NY (7.3%), FL (6.1%), NJ (6.1%), NC (4.8%), other states accounted for 47.6%. 92% of participants were born in the United States while.5% were born in Puerto Rico, Guam, U.S. Virgin Islands/Northern Marians, while .7% were born aboard of American parent(s), 4.1% were a U.S. citizen by naturalization or other legal means, and 2.7% were not a citizen of the United States. The researchers excluded some data points on age due to participants not properly filling out this section. For the most part the researchers had an equal distribution of ages anywhere from 65 to 18 years of age, extreme values were excluded.

For Household status 28.6% respondents said they were a single adult, 6.5% single parent with child/children, 26.2% couple without children, 35.6% were couples with children, and 3.1% with other household status. 10.7% were unemployed, 59.3% employed, 12.6% homemakers, 13.6% retired, and 3.9% were students. 43.3% said they worked 0-10 hours per week outside the home, 8.7% (11-20 hours), 10.2% (21-30 hours), 20.6% (31-40 hours), 13.6% (41-50 hours), and 3.6% (more than 50 hours). 9.7% responded their total household income was <15,000, 16% (15,000-29,999), 18.4% (30,000-44,999), 17.2% (45,000-59,999), 14% (60,000-74,999), 9.4% (75,000-89,999), 5.1% (90,000-105,000), and 10.2% (>105,000). 1% had less than a high school education, 1.9% some high school, 15% had a high school diploma/GED, 4.8% technical school, 29.5% some college education, 8% associate's degree, 25.2% bachelor's degree, 12.8% master's degree, and 1.7% a doctoral degree.

Results relating to Objectives 1 and 2: Determine food handling perceptions and behaviors based on demographic characteristics.

The sample was asked to rate the importance (perception), and activity (behavior) related to 23 food safety handling items in five constructs suggested by Medeiros et al. (2001). The tag line for importance items stated "How important is it to…" The responses were recorded on a 7-point, Likert-type scale with 1 representing —"Not at all important" and 7 representing —"Extremely Important". Behavioral items were similarly rated on a 7-point, Likert type scale with a tag line of "How often do you…" Their responses were recorded with 1 representing "Never" and 7 representing "Always". The results of all the questions are presented in Table 1.

Table 1

Mean Scores of Safe Food Handling Perceptions and Behaviors by Ethnicity

Constructs and Questions	Perceptions			Behaviors		
	Caucasian	All Minorities	Overall	Caucasian	All Minorities	Overall
Construct 1. Personal Hygiene						
Q1. Wash hands thoroughly before preparing or consuming food?	6.58	6.57	6.58	6.46	6.53	6.47
Q2. Wash hands thoroughly after playing with a pet and before getting a snack?	6.49	6.68	6.52	6.27	6.60	6.32
Q3. Wash hands thoroughly after handling raw eggs, raw meat,	6.75	6.72	6.75	6.64	6.65	6.64

raw chicken, or raw seafood?						
Q4. During preparing or consuming food that you wash your hands after touching your eyes, mouth or nose?	6.30	6.43	6.32	6.00	6.21	6.03
Construct 2. Adequate Cooking						
Q5. When cooking fish, checking that the flesh flakes easily with a fork before serving?	5.80	5.75	5.79	5.65	5.54	5.63
Q6. Use a food thermometer when cooking meat, poultry or fish?	4.84	4.94	4.85	4.36	4.34	4.36
Q7. Cook eggs till both the yolk and white are firm?	4.94	5.22	4.98	5.17	5.18	5.17
Q8. Make sure your hamburger is cooked well done?	5.21	5.75	5.30	5.23	5.78	5.32
Construct 3. Avoiding Cross Contamination						
Q9. Wipe off counter tops with a soapy dishcloth after having put a package of raw eggs, raw meat, raw chicken or raw fish on the counter top?	6.41	6.35	6.40	6.38	6.34	6.38
Q10.Wash a plate that was used to hold raw meat, poultry, or seafood with hot, soapy water before returning cooked food to the plate?	6.69	6.57	6.67	6.67	6.49	6.64
Q11. Wash all items that came in contact with raw eggs, raw meat, raw chicken, and raw seafood (e.g. Cutting board, knife, mixing bowls for batters, and counter top) with hot, soapy water before continuing cooking?	6.53	6.34	6.50	6.40	6.28	6.38
Q12. Keep raw eggs, raw meat,	6.61	6.44	6.58	6.53	6.34	6.50

raw chicken, raw seafood and utensils that were used in preparing these food items away from all vegetables that will not be cooked?						
Construct 4. Cold/Hot Storage Holding						
Q13. Put a carton of eggs into the refrigerator right after coming back from the store?	6.26	6.26	6.26	6.50	6.26	6.46
Q14. Refrigerate Cooked Rice within 2 hours of preparing or serving?	5.28	5.34	5.29	5.58	5.29	5.53
Q15. Refrigerate Fried Chicken within 2 hours of preparing or serving?	5.86	5.47	5.80	5.93	5.49	5.85
Q16. Refrigerate Refried or Cooked Beans within 2 hours of preparing or serving?	5.33	5.60	5.38	5.69	5.47	5.65
Q17. Refrigerate Ready to Eat foods (hot dogs, deli meats, washed and cut fruit and vegetables) immediately after coming back from the store?	6.21	6.10	6.19	6.41	6.13	6.36
Construct 5. Avoiding Foods From Unsafe Sources						
Q18.Use the microwave on defrost setting to defrost frozen meat, frozen chicken or frozen fish?	4.54	4.50	4.53	4.44	4.03	4.37
Q19. Use the refrigerator to defrost frozen meat, frozen chicken or frozen fish?	5.42	5.40	5.41	5.36	5.31	5.35
Q20. Drink only pasteurized milk?	5.69	5.59	5.67	6.10	5.66	6.03
Q21. Purchase oysters from health approved suppliers?	5.31	5.44	5.33	4.97	5.29	5.02

Q22. Throw away any food that is past an expiration date?	5.74	6.03	5.79	5.81	6.10	5.86
Q23. Keep household cleaners away from open containers of food?	6.46	6.35	6.44	6.54	6.44	6.52

Note. Perceptions 7-point scale (1=not at all important, 2=low importance, 3=slightly important, 4=neutral, 5=moderately important, 6=very important, 7=extremely important)
Behaviors 7-point scale (1=never, 2=rarely true, 3=sometimes but infrequently true, 4=neutral, 5=sometimes true, 6= usually true 7=always true)

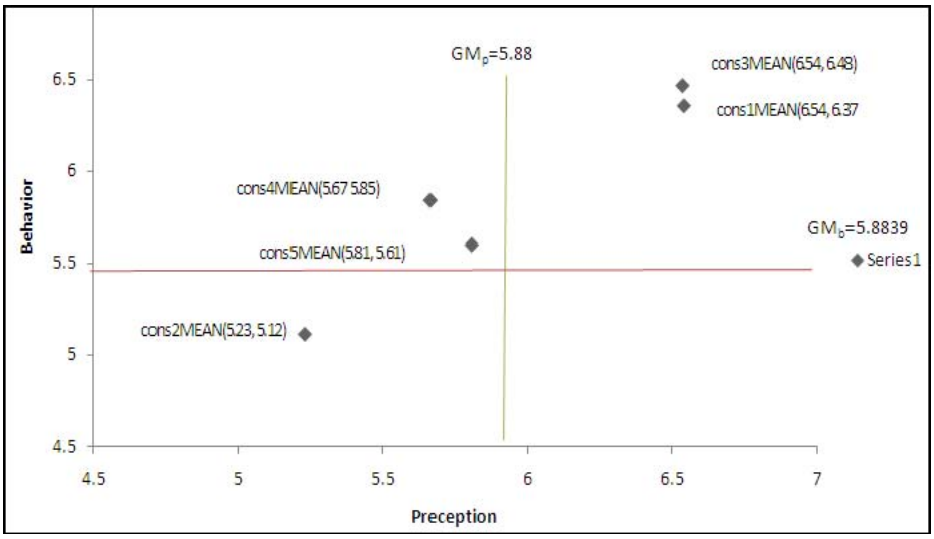

*Figure 2.*Determination of critical needs by construct of all groups (this includes both groups Caucasian, and Minority respondents). In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

Results relating to Objectives 3 and 4:
Determine critical needs of minority versus majority group.
Determine relationships between critical needs of demographic groups.

The sample was separated by ethnicity for further analysis. All minority populations were combined to generate adequate representation for each sub-group. The results of the matrix analysis for each ethnic sub-group can be seen in Figures 3 and 4.

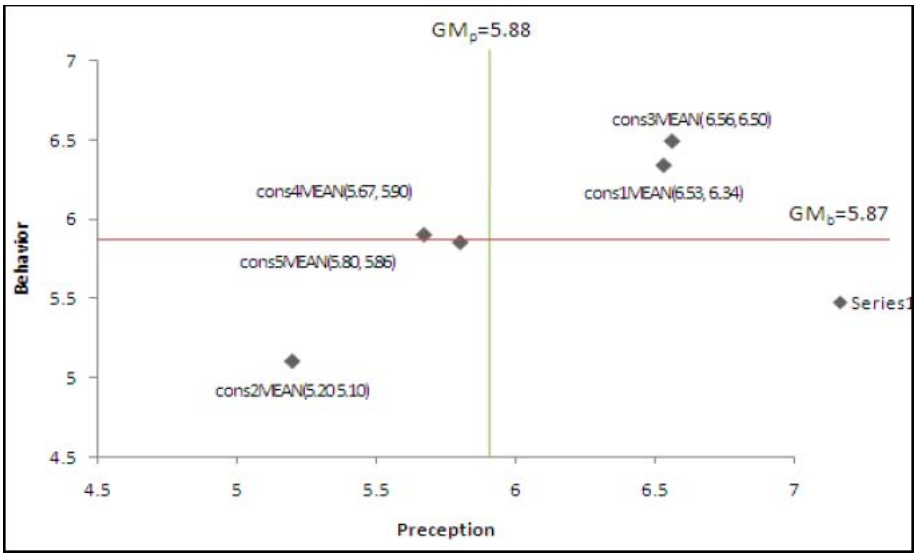

Figure 3. Determination of critical needs of Caucasian respondents by construct.
In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

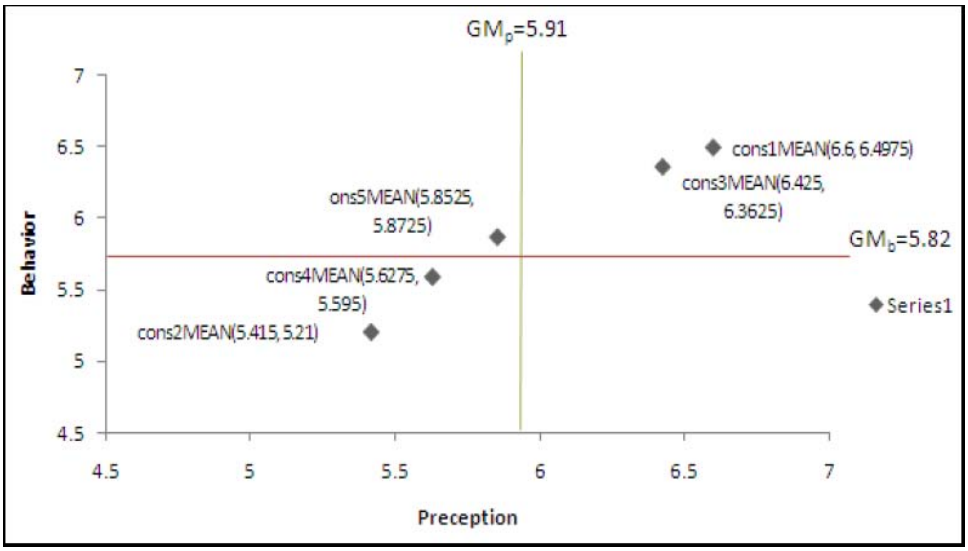

Figure 4. Determination of critical needs of minority respondents by construct.

In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

All figures 2, 3, and 4 indicated that constructs 1 and 3 are identified as successful programs while constructs 2 and 5 are low-level needs. Construct 4 was identified as a low-level

successful program. Since neither group were determined to have a critical need, and the other need categories were identical, item analysis were limited to the entire population rather than analysis of each sub-group. Results of the item analysis within each construct are presented in Figures 5-9. Question labels coincide with question labels in Table 1.

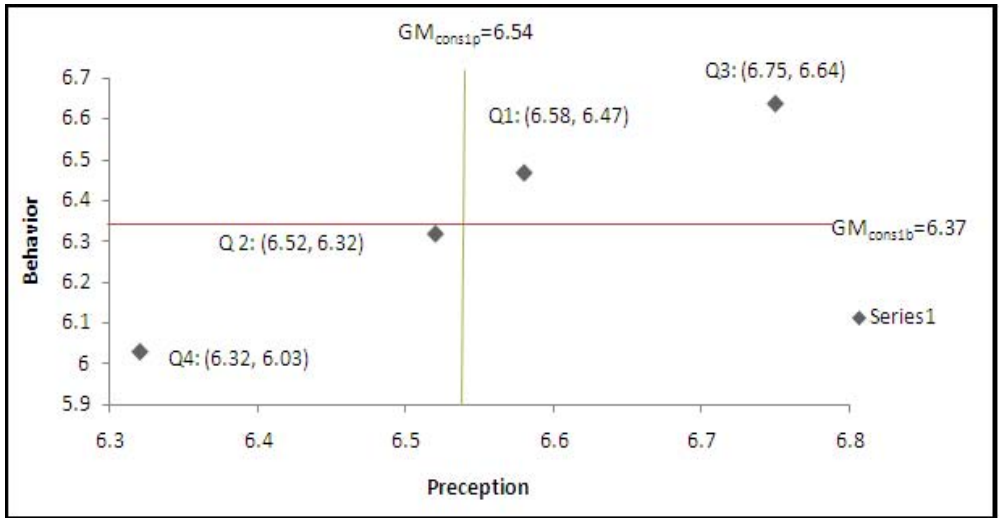

Figure 5. Determination of Critical Needs in Personal Hygiene (Construct1).

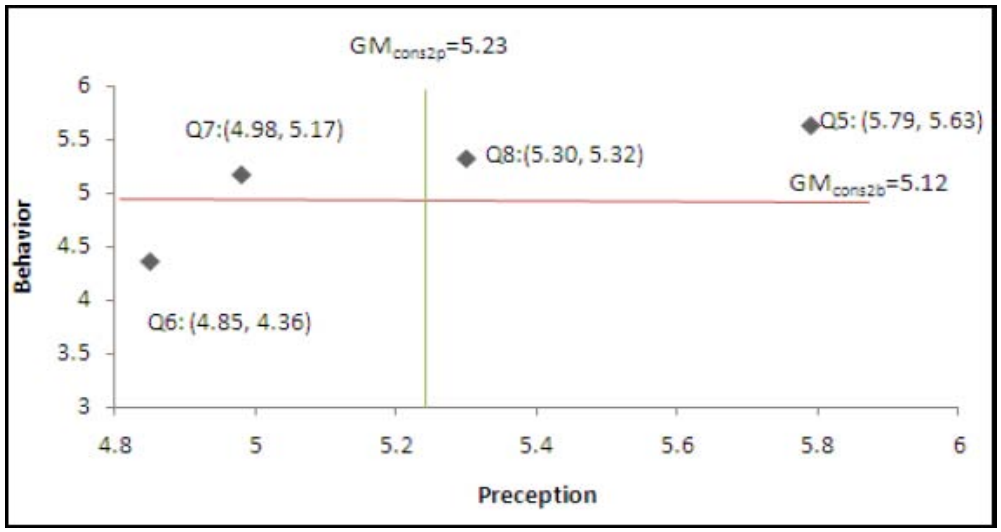

Figure 6. Determination of Critical Needs in Adequate Cooking (Construct2).

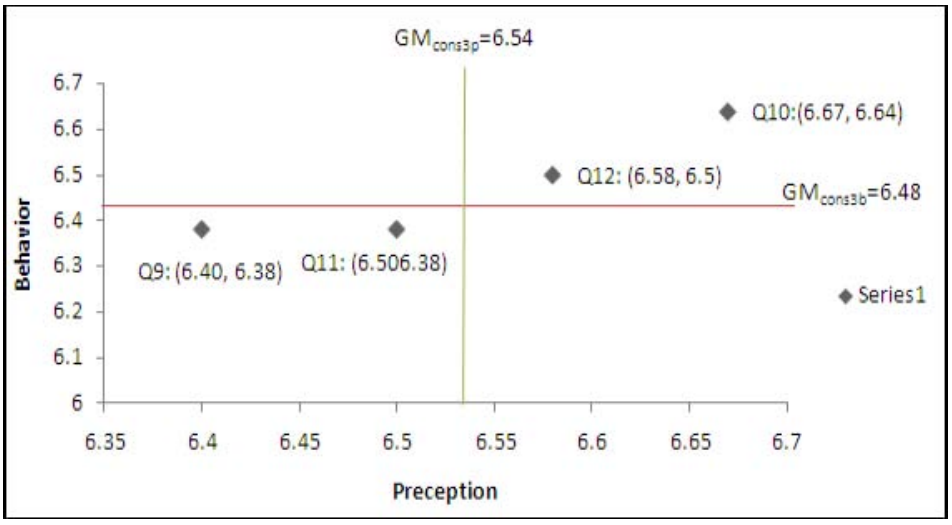

Figure 7. Determination of Critical Needs in Avoiding Cross Contamination (Construct3).

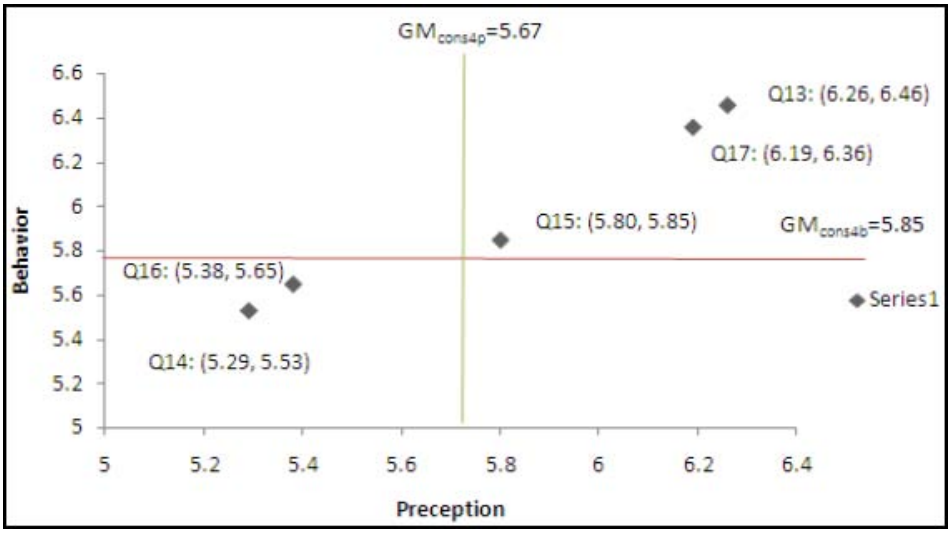

Figure 8. Determination of Critical Needs in Cold-Storage/Hot Holding (Construct4).

Figure 9. Determination of Critical Needs in Avoiding Foods from Unsafe Sources (Construct5).

Conclusions

Figures 5-9 demonstrated some very important findings in identifying successful programs as well as programs which needed later action to the point of re-entrenchment.

Personal hygiene (Figure 5) Question 1 and 3 proved no critical needs exist, and only requiring a monitoring for excellence. While Question 2 and 4 showed a low level need quadrant requiring it to be a secondary priority for later action.

Adequate cooking (Figure 6) showed no critical need for Questions 8 and 5 in quadrant 1 an indication of a successful program. However, Question 6 produced a low level need which should be a secondary priority for later action. Question 7 was a low level successful program, and should be re-examined for re-entrenchment of education material.

Cross contamination (Figure 7) questions 10 and 12 showed to be a successful program only requiring monitoring for excellence. Questions 9 and 11 showed a low level need requiring later action.

Cold/Hot storage/ holding (Figure 8) Questions 13, 15, and 17 indicated a successful program (monitoring for excellence is required) while Questions 14 and 16 are low level and showed a need for later actions. Questions 18, 19, 21 are of low level needs for later action. Questions 20 and 22 indicated a low level successful program, and should be re-examined for re-entrenchment of education materials.

Avoiding food from unsafe sources (Figure 9) showed a critical need with Question 23. Thus this area should be a 1st priority for program improvement.

The researchers were unable to detect any distinct differences among all Groups vs.

Caucasians vs. all Minorities. It is possible the small percentage of minority respondents in this study may have contributed to a lack of detectable differences. The results of this study showed education of personal hygiene, and avoiding cross contamination were being effectively taught, and the researchers should continue with current educational practices, and monitor this program for excellence. This 2009 study pointed out that a second priority should be considered-adequate cooking which would require educational materials addressing the behavior/ perception of food safety education in regard to the preparation of foods. Also, cold storage/hot holding falls into this category of the requirement for the need of educational materials addressing safe handling of food storage practices. The researchers discovered cold storage/hot holding, and avoiding foods from unsafe sources should be examined to the degree of re-entrenchment of educational materials. Avoiding food from unsafe sources showed a critical need. The researchers concluded this should be a 1st priority for program improvement.

Recommendations

This research provides evidence that dissemination of educational materials should be equally effective for all ethnicities. On the basis of construct factors-the researchers recommend developing educational materials which better target keeping household cleaners away from food; as this was identified a critical need among all groups. There is more work to be done to improve the perception and behaviors of food safety. The construct areas of concern for secondary priority in ensuring targeted food safety materials that need to be better addressed are-adequate cooking, cold-storage/hot holding, washing hands after playing with a pet, and then getting a snack, during preparation/consumption of food if a person washes their hands after touching their eyes, nose or mouth, and the use of a food thermometer, if they wipe off counter tops after putting raw eggs, meat, fish, on a counter top, refrigeration of rice or cooked beans within 2 hours, use of a microwave or refrigerator on defrost to defrost potentially hazardous foods, and purchase of oysters from approved food suppliers. While this study indicates an entire construct does not necessarily bring forth concern, within each construct there are areas of low level needs leaving further room for improvement in educational materials development. It is recommended these areas of specific low level needs be more closely addressed in future curriculum.

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A Look Inside: Self-leadership Perceptions of Non-formal Educators

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Introduction

It can be said that leadership is all around us. However, take a look inside; sometimes leadership from a personal standpoint (sometimes called intrapersonal) can be considered one of the most overlooked aspects in leadership development. Personal development in leadership is important; according to Janet Ayers (1987) it s the first and most fundamental step in leadership development. This can include aspects such as understanding the essence of leadership, assessing personal strengths and weaknesses, and developing a personal philosophy of leadership (Ayers, 1987). Other researchers contend that aspects such as personal growth and self-efficacy are considered to be instrumental to the success of community leaders (Pigg, 2001; Rasmessen, 2006). Each of these aspects illustrates the importance of understanding oneself as a leader.

Self-leadership – or the process through which people influence themselves to achieve the self-direction and self-motivation necessary to behave and perform in desirable ways, is a relatively new direction in leadership development. By performing this study, we hope to explore how Extension educators see themselves as leaders, and how they self-direct and motivate themselves to success. Essentially to answer the questions "How do you see yourself as a leader?" and "How do you motivate yourself to success?"

Theoretical Framework

Self-leadership theory as outlined by Houghton and Neck (2002) focuses on specific sets of behavioral and cognitive strategies designed to shape individual performance results. Self-leadership strategies can be categorized into three general groupings: behavior-focused strategies, natural reward strategies, and constructive thought pattern strategies. Behavior-focused strategies are aimed at encouraging self-awareness leading to behavior management, and specifically include self-observation, self-goal setting, self-reward, self-punishment and self-cueing. Natural reward strategies center in the more enjoyable aspects of an activity, and is operationalized through focusing thoughts on natural rewards. The final category is constructive thought pattern strategies which can be described as the creation and maintenance of functional thinking patterns – or how individuals think. Strategies specific to this category include visualizing successful performance, self-talk and evaluating beliefs and assumptions. Each of these strategies contribute to how one sees oneself intrapersonally – and can assist in laying the foundation for success.

Methodology

This was a quantitative, exploratory study. The target population for this study was extension educators across three states, regardless of subject area. Researchers used a random sampling of extension educators, with sample size being determined by the recommended size according to Krejcie and Morgan (1970). Total sample size for the study was (n = 520), with a response rate of 38%. The instrument used was the revised self-leadership questionnaire (Houghton & Neck, 2002) modified for the desired audience. The content and face validity of the instrument was established by having a panel of experts review the instrument. The calculated reliability for each of the strategies listed is between 0.74 and .93, indicating an acceptable reliability for the instrument.

Findings

The demographics of the respondents were very similar across states. In general, the respondents were predominately female, in the middle age range (between 30-49 years of age), and at the beginning of their career (less than 5 years experience). A majority of the respondents had M.S. degrees, and over 95% were White Caucasian.

Regarding the three dimensions of the revised self-leadership scale, respondents more strongly identified with the behavior-focused and natural reward strategies, than the constructive thought pattern strategies. More specifically, educators responded that they strongly identified with the "self-observation" and "self-cueing" strategies within the behavior-focused strategies, and "focused thoughts on natural rewards" on a regular basis. "Self-goal setting" was also identified as a popular strategy, although at a slightly less degree than the aforementioned ones. "Visualizing successful performance" was the only strategy within the constructive thought pattern strategies grouping that was noted; participants didn't really strongly identify with any other strategies within this group.

Implications

Overall, it seems that Extension educators are strongly aware of how to successfully reward themselves, and plan their behavior to make successful leadership choices. However, the lack of awareness of how their thought processes contribute to leadership success is troubling; a noted implication of this study is to incorporate more literature regarding how to successfully "self-talk", evaluate one's beliefs and assumptions, and visualize successful performance will be incorporated into future Extension curriculum.

It should be noted, that while the researchers are confident in the results of their study, they do realize the limitations of this study and strongly recommend that this study be replicated so results can be generalized to a larger population.

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A Model for Improving Faculty Instruction in Colleges of Agricultural & Environmental Sciences

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Introduction

As universities grow and establish satellite campuses to better serve students, teaching responsibilities are often placed on faculty that previously only focused on research. This situation, while providing opportunity to transfer new research findings directly to university students, also creates a situation where people with no education training are expected to teach successfully. To address this issue, the University of Georgia Department of Agricultural Leadership Education and Communication held a series of workshops, in 2008, to improve college teaching. The entire Tifton Campus faculty and staff were invited to attend workshops delivered by agriculture education faculty and lunch was provided in order to encourage participation

Conceptual Framework

The [College] at [University] established undergraduate programs on the [Satellite] Campus in 2004. This campus has housed research faculty for many years, yet few faculty members had experience teaching undergraduate courses. Consequently, a series of faculty development workshops were developed and conducted that focused on the implementation of learner-centered teaching techniques to improve comprehension and retention (McKeachie, 2006). Participants were administered a pretest before the series of workshops to determine their level of knowledge concerning such techniques. Following the workshops, a posttest and a survey were administered to determine the change in participants' knowledge base as well as the

participants' perceived value of each of the experiences (Waters & Haskell, 1989). Workshop topics covered a broad range of topics important for developing effective teaching skills. While the immediate intended result of this project was to assist faculty members to develop professionally as "new" instructors, the long range goals include the development of graduates who recognize the intricate relationship between math, science, and agriculture.

Methodology

The 2008 series of workshops were conducted beginning the Friday of the first week of the fall semester and continued each Friday for four weeks. The first workshop was scheduled for 90 minutes and subsequent workshops were 60 minutes. Topics covered during each workshop are listed in Table 1. All campus-wide faculty from the Tifton campus were invited to attend and while topics were presented in a complimentary sequence, they were independent of each other, thus faculty could choose to attend any or all of the presentations. Participant responses were recorded using a pre and post test as well as a final evaluation form with open ended questions and statements with Likert-type responses. Means and standard deviations were calculated for pre and post test items and final evaluation items using SPSS 14.0.

Table 1

Teaching Faculty Workshop Series Topics

Meeting	Topics Covered	Pre Test	SD	Post Test	SD	Dif.
1	Teaching Theories	2.3	0.34	3.2	0.75	0.9
	Teaching Philosophies	2.9	0.25	4.1	0.34	1.2
	Teaching Styles	3.1	1.32	4.6	0.79	1.5
	Learning Styles	2.4	0.76	4.4	0.13	2.0
	Instructional Planning	3.7	0.34	4.9	0.65	1.2
2	Delivery Methods	3.2	0.39	4.5	0.25	1.3
	Instructional Technologies	4.0	0.23	4.9	0.41	0.9
3	Effective Teaching Methods	3.0	0.43	4.8	0.29	1.8
4	Evaluation of Student Learning	2.9	0.86	4.5	0.13	1.6

Findings

According to the pretest, participants self reported that they were least familiar with the concepts related to teaching theories (2.3) and learning styles (2.4); the participants were most familiar with instructional technologies (4.0) and instruction and instructional planning (3.7). Analysis of the posttest indicated that, following the workshops, participants were least familiar with teaching theories (3.2) and teaching philosophies (4.1); the participants were most familiar in the areas of incorporating instructional technology (4.9) and instructional planning (4.9). The survey revealed that participants showed the greatest self reported change in knowledge with learning styles (2.0) and effective teaching methods (1.8).

Conclusions

Participants in this series did show a marked increase in knowledge reflective of the workshops that were offered; they took away the highest self reported increase in knowledge regarding learning styles and effective teaching methods. While the increase in knowledge regarding the topics listed in the workshop is a positive indication that the workshops were effective the participants still showed a considerable lack of knowledge regarding teaching theories.

Recommendations

The majority of University of Georgia faculty teaching at the Tifton campus have had no training in how to be effective teachers. The presence of faculty teaching agricultural education courses provides an opportunity to share information on teaching and learning in a format suitable for faculty continued professional development. The findings of this research suggest that future professional development workshops should be conducted by agriculture education faculty to assist other faculty in developing teaching skills.

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An Evaluation of Pre Service Teachers' Undergraduate Coursework in Relation to STEM Integration within Agricultural Science Curricula

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Introduction

The passage of The No Child Left Behind Act of 2001 and the changes in high school graduation requirements has resurfaced the idea of academic integration within agricultural science education. Science integration within agriculture has been a topic of research interest since as early as the mid 1980's (Budke, 1991; Fraze, 1993; Malpiedi, 1989; Trexler & Barrett, 1992; Vaughn, 1993) when academics, particularly science, were recognized as always being an integral part of the agricultural education curriculum (Budke ; Hillison, 1996; Thompson & Blaschweid, 2000; Vaughn). Agricultural science teachers have been encouraged to place more emphasis on the science, technology, engineering and mathematics (STEM) by integrating curricula that addresses standards in science, mathematics, and other content areas (Brister & Swortzel, 2007) and are being pressured to show evidence of how their curricula helps increase students' scores on state standardized assessments. According to previous research "students taught by integrating agriculture and scientific principles demonstrated higher achievement than did students taught by traditional approaches" (Balschweid, Thompson & Cole, 2000, p. 37). Core subjects such as science and math play a large role in the agricultural industry (Vaughn). Myers, Washburn and Dyer (2004, p. 44) state that, "Teachers of agriculture in the secondary schools are being called upon to integrate curriculum that addresses standards in science, mathematics, and other content areas." Teachers of agriculture feel that there are many barriers that are hindering the increase of integration of core subjects such as science and math. One of the most prominent barriers that teachers feel is the lack of science competence among teachers in agricultural education and the lack of integrated science curriculum are also barriers to the increase of science integration within agricultural classrooms (Balschweid & Thompson, 2002; Thompson & Balschweid). Because teachers of agriculture education are being called upon to integrate science, mathematics and other content areas into their curricula, current teachers feel that teacher preparation programs should provide instruction at the pre service level on how to

integrate science and other content areas into the agricultural education curriculum (Balschweid & Thompson; Balschweid et al., 2000; Layfield, Minor, & Waldvogel, 2001; Myers & Thompson, 2008; Myers et al., 2004).

Purpose

The purpose of this study was to determine what pre service teachers' believe should be incorporated into their undergraduate coursework to better prepare them to integrate core content areas into the agricultural science curricula, upon obtaining an agricultural teaching position.

Methodology

This study was qualitative in design. Agricultural science pre service teachers that participated in the student teaching internship experience in the Fall of 2009 at a southern university were purposively sampled (N=14) for this study. All participants were agriculture science majors and were pursuing teacher certification, following their student teaching internship experience. Data was collected through two focus group interviews. Responses were recorded and transcribed by the researcher. Member checks and peer reviews were completed to increase trustworthiness.

Results/Findings

Pre service teachers indicated that coursework that focuses on the integration of academics within agricultural science should be incorporated into the undergraduate curriculum, for instance "…a teaching math for agriculture class" (FG1). According to the pre service teachers, "If we are expected to integrate there should be a point to where we are taught about how to integrate…" so that they know which core subject concepts "…will go good with [agriculture concepts] …" otherwise they will be "…searching aimlessly on the internet for hours" (FG1). If the pre service teachers are not taught about how to link core subjects to agriculture concepts then they "…have to look through so many [state standards/benchmarks]…" because they "…have no clue what course it should be under for science and math" (FG1).

The pre service teachers believe that if they were informed about academic integration early on in their undergraduate coursework then they would be more cognizant of where academics are utilized within agriculture as they work through their undergraduate coursework. According to the pre service teachers, "When you are taking those core classes…you need to understand how you can integrate this [core] into your ag teaching…if I would have known about STEM integration what it was and how I am going to use it, I may have been able to retain information better and figure out different ways I could apply it to that…if I would have seen it before [class] I may have been able to figure out ways to take those core classes" (FG2)

Pre service teachers indicated that the teacher educators should, "make a guide for STEM integration" (FG1). Furthermore they believe that making "…a guideline of the topics….like different topics you would cover in a 101 class and out beside it, different concepts in science, technology, math, English that correlates with the materials so that you have a reference point

and then you can build on that more if you want" (FG1) would help them integrate STEM more often.

Implications/Recommendations/Impact on Profession

Pre service teacher curricula within agricultural science should include a required course that teaches pre service teachers how to integrate STEM into the agricultural science curricula. The new required course should be taken early on in their college career, freshman or sophomore year; because being informed early in their college career would allow pre service teachers to identify, to a higher degree, how science and math accompany agricultural concepts such as those learned in their animal science courses. STEM integration guides should be created that link STEM concepts to the agricultural concepts taught. These guides would allow teachers to spend less time preparing lesson plans that integrate STEM. The creation of STEM integration guides would encourage the increase of rigor within the agricultural classroom and assist STEM teachers in adding relevance to their classroom as well. Further research should be conducted to determine what current agricultural science teachers need to assist them with the integration of STEM in their classroom.

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Analyzing Social Networks in Pre service Teacher Education

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Introduction

Pre service teachers within agricultural science possess a large library of resources from which they can develop lesson plans and learn content material. In today's technologically dependent society pre service teachers have information at their fingertips 24 hours a day. According to Roberts, Murphy and Edgar (2008, pp. 795-796), "the dynamic process of knowledge acquisition relies on social interactions to clarify knowledge and process experiences." The student teaching internship experience allows for pre service teachers to socially interact with a plethora of individuals; high school students, teachers, university faculty and fellow pre service teachers. The social interactions that occur during the student teaching experience affect pre service teacher behaviors (Bandura, 1977) and allow for the development of communities of practice. Social interaction can occur through a variety of paths. The technological advancements in social networking have provided quicker more convenient avenues. According to Howe & Strauss (2000), students in today's society, the Millennial Generation, are well versed in internet usage and have always been immersed in a technology-rich environment. Fallows (2004) found that the Millennial Generation possesses a favorable attitude in regards to the value of Internet use. The theoretical foundation of this study is rooted

in the grand theory of Kolb's experiential learning model, which consists of four components; active testing, concrete experience, reflective observation and abstract hypothesis (Jensen, 2008). During their student teaching internship experience, pre service teachers progress through all four components of Kolb's cycle. Communication between student teachers is especially important in facilitating reflective observation.

Purpose

The purpose of this study was to explore social interaction between pre service teachers during the student teaching internship experience; describing the purposes and frequencies of, and methods used for, student to student interactions.

Methodology

A researcher developed instrument was used to assess interaction between student teachers during the Fall 2007, Spring 2008, and Spring 2009 semesters. The four–question instrument was constructed as a matrix with all pre service teachers' names as column headers and the questions (with response options) as row headers. The first two questions were designed to solicit the frequency in which each pre service teacher interacted with each of their peers. The third question asked participants to identify all the technologies they used to communicate with each peer. The fourth question sought to determine the reasons for which each participant communicated with each of their peers: Venting/Reflecting (V/R), Planning/Information (P/I), and/or Social/Personal (S/P). Comparisons were made between the groups addressing the purposes and frequencies of, and methods used for, student to student interactions. Social networks were examined using KeyPlayer; a software program that identifies optimal sets of nodes in a network, or the number of distinct, or non–redundant, connections to others. The resulting network models for each purpose (V/R, P/I, & S/P), within each group, were compared to attempt to identify similarities, differences, and trends.

Results/Findings

Pre service teachers frequently interacted throughout their student teaching experience ($M = 24.44$, $N = 59$). The average frequency of interaction increased from one group to the next. Group one (Fall 2007) interacted an average of 15.77 (min = 3, max = 34) times, group two (Spring 2008) interacted an average of 27.95 (min = 11, max = 48) times and group three (Spring 2009) interacted an average of 31.75 (min = 13, max = 56) times throughout the student teaching experience. Student teachers interacted for a variety of purposes. Between all three groups 98.3% ($N = 58$) of the pre service teachers interacted for P/I purposes, 93.2% ($N = 55$) interacted to V/R and 91.5% ($N = 54$) of the pre service teachers interacted for S/P purposes. When analyzing the key players group one possessed six key players in overall interaction and only one of those key players served as a key player in P/I. In group two, three key players immerged overall and none of the key players surfaced as key players in V/R, P/I and S/P interaction. In group three, one key player immerged overall and the individual key player was also a key player in S/P interaction as well. Pre service teachers utilized face to face communication most often ($M = 5.83$, $N = 59$), followed by the use of the phone ($M = 4.07$, $N = 59$). The methods of interaction among the groups varied. Groups one and two were similar in their methods of interaction using face to face

communication as the most common form of interaction (group one, M = 5.05; group two, M = 7.33) to communicate. Group three most frequently interacted through text messaging (M = 3.52), utilizing this technology to a higher degree than groups one and two. The least used forms of methods of communication were instant messaging and Facebook. Even though Facebook was the least used forms of social interaction it is still noted that Facebook was utilized to a higher degree by group three than groups one and two.

Conclusions, Recommendations, and Implications

1) In examining these three semesters, student teachers are interacting more. Social interaction among students, students contacting students, still occurs most frequently by face-to-face communication, and second by phone. That remains startling to the authors. 2) The use of text messaging has increased, significantly in the last year. The use of Facebook, while not statistically different, appears to be increasing. 3) Student teachers continue to primarily interact with small networks of three to five peers. The makeup of these networks remains dependent on the purpose of the of the interaction.

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Attitudes and Educational and Career Choices of Food and Agricultural Sciences Institute Participants

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Introduction

Ethnic minority students traditionally pursue degrees and careers in the food and agricultural sciences at rates lower than their non-minority counterparts. To counter this problem, high schools and colleges have been encouraged to collaborate to help students learn what is required to succeed after high school. One university responded by creating the Food and Agricultural Sciences Institute (FASI) in 1994. FASI introduced science-oriented ethnic minority students to educational, career, and research opportunities during a weeklong summer experience. In total, the FASI experience provided a comprehensive overview of the food and agricultural sciences and related educational and career opportunities.

Purpose and Objectives

The purpose of this longitudinal study was to examine the attitudes that former FASI participants now have toward the food and agricultural sciences and factors that influenced their educational and career choices. To guide the study, three research questions were developed:

1. What attitudes do former participants now hold about the food and agricultural sciences?
2. What educational programs have the former participants chosen and what events and experiences most influenced their decisions?
3. What types of careers have the former participants chosen and what events and experiences most influenced their decisions?

Methods and Procedures

The population for this study consisted of former high school students (N=154) who participated in FASI between 1994 and 2001. A survey instrument was employed to collect the needed data. This survey instrument was reviewed for content and face validity by a panel of experts consisting of faculty members and graduate students in a department of Agricultural and Extension Education. The instrument consisted of Likert-type items related to educational and career choices, and participants' attitudes toward the food and agricultural sciences. The data were collected in three stages. Fifty-seven individuals (37%) responded to the survey. Given the response rate, no attempt was made to generalize the findings to the population. Consequently, descriptive statistics (frequencies, percentages, means, and standard deviations) were computed to analyze the data.

Findings

The respondents exhibited positive attitudes toward the food and agricultural sciences. They also agreed strongly that careers in the food and agricultural sciences touch the lives of all people each day. Four respondents reported completing a degree in the food and agricultural sciences or related areas. Of those who were currently enrolled in a degree or certificate program, two were completing a major in the food and agricultural sciences. Five respondents reported that FASI had a very high influence on their decisions to pursue a postsecondary degree or certificate and 13 reported a high influence on their decisions. Seventeen respondents identified a parent or family member as most influencing their decisions to pursue a postsecondary degree.

Three respondents indicated they were employed in the food and agricultural sciences or related fields, i.e., veterinary sciences, a dairy cooperative, and the Peace Corps. One respondent reported that FASI had a very high influence and seven reported that it had a high influence on their choice of career.

Conclusions and Recommendations

Students must acquire sufficient agricultural knowledge and educational experiences before they can develop the attitudes necessary to behave in the desired manner. However, when recruiting students of this caliber, multiple approaches must be employed over time. Also, it is imperative to influence the family members and related personal factors.

Overall, FASI had a positive influence on the attitudes that the respondents had developed toward the food and agricultural sciences, but marginal impact on their educational and career behaviors. Based upon the study's findings, the following recommendations were made:

1. Colleges of agricultural sciences should continue enrichment and awareness programs that enable minority youth to understand the educational and career opportunities in the food and agricultural sciences and to develop the desired positive attitudes.

2. Recruitment efforts that target ethnic minority students should focus on their parents, guardians, family members, and personal factors that related research has identified as impacting the educational and career decision-making process. Also, more systematic, longitudinal research is needed to understand the complex interactions and dynamics inherent in moving young adults beyond the development of positive attitudes to the desired behaviors such as pursuing degrees and careers in the food and agricultural sciences.

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Characteristics of Missouri Agricultural Mechanics Programs: A Generational Review

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Introduction/Theoretical Framework

Agricultural education laboratories are an essential component of the total secondary agricultural education program (Phipps & Osborne, 1988). According to Sutphin (1984), the use of school and community laboratories, where students employ "learning by doing," is an integral part of agricultural education programs. Johnson, [Author], and Stewart (1990) stated that students learn important psychomotor skills in agricultural mechanics education and that much of the instruction takes place in the school agricultural mechanics laboratory.

Agricultural mechanics courses are the most popular secondary agricultural education classes offered in [state] following the two introductory classes ([State Department of Education], 2008.) With the continuing popularity of these classes, research was conducted to determine the size and scope of agricultural mechanics programs in [state]. Researchers utilized a mailed questionnaire, sent to selected agriculture teachers, to conduct this descriptive study. Results from this study were compared to the 1990 study conducted by Johnson, [Author], and Stewart and the 1989 dissertation work by Johnson to determine trends in [state] agricultural mechanics programs.

Purpose and Objectives

The purpose of this research was to replicate the study conducted in 1990 by Johnson, [Author], and Stewart entitled *An analysis of the agricultural mechanics laboratory management in-service needs of [state] agriculture teachers,* to gain current information regarding [state] agricultural mechanics programs and the agriculture educators who manage them and then compare those characteristics with the characteristics of the 1990 study. The research objects were as follows:

1. Identify selected characteristics of [state] secondary agricultural mechanics programs from the 2006 to 2008 academic school years and compare them with the characteristics of [state] secondary agricultural mechanics programs from the 1987 to 1989 academic school years.

2. Identify the 2008 characteristics of [state] secondary agricultural education teachers who supervise agricultural mechanics laboratories and compare them to the 1989 characteristics of [state] secondary agricultural education teachers who supervised agricultural mechanics laboratories.

Methodology

The population for this study was all secondary agriculture teachers in [state] responsible for managing an agricultural mechanics laboratory in 2007 (n = 424). [State agricultural education supervisory staff] assisted in the identification of the frame. A random sample size of 205 was determined adequate to represent the population (Krejcie & Morgan, 1970).

Utilizing Dillman's (2007) recommendations for collecting data, usable responses were received from 110 [state] secondary agriculture teachers for a 55% response rate. An independent samples *t* test indicated that no significant differences ($p < .05$) existed between the early and late respondents based on their perceptions of the importance of, or their ability to perform, each of the agricultural mechanics laboratory management competencies. Since no significance differences were found between the early and the late respondents, the results of this study could be generalized to the population (Lindner, Murphy & Briers, 2001).

Results

Current [state] agriculture teachers are completing fewer university semester credit hours of agricultural mechanics courses than their 1989 counterparts and teach approximately 30% more students. On average, [state] agriculture teachers studied in 2008 had nearly the same number of years of teaching experience and spent nearly the same number of hours supervising student work in agricultural mechanics laboratories as did teachers 19 years ago. [state] agricultural mechanics laboratories are five years older and have nearly 48 square feet less per student. Compared to two decades ago, current agricultural education programs spend $11.30 less per student on agricultural mechanics consumables.

The average number of agricultural mechanics courses taught by [state] agriculture teachers, in a two year academic period, has nearly remained unchanged (Johnson, 1989).

However, the introductory course, Agricultural Science II, has decreased in the number of times that it has been taught by [state] agriculture teachers from an average of 3.39 times in 1989 to an average 2.85 times in 2008.

Conclusions and Recommendations

Agricultural mechanics programs remain a popular choice for secondary agricultural education students in [state]. Today's teachers are teaching more students, in smaller laboratories with less money spent per student on agricultural mechanics laboratory consumables. In addition, these teachers have less overall experience and less pre-service and graduate instruction in agricultural mechanics.

Agricultural education faculty, state agricultural education supervisors and local school administrators should offer pre-service and in-service educational programs for secondary agriculture teachers who are responsible for managing and instructing students in an agricultural mechanics laboratory. Further research should be conducted to determine the size and scope of agricultural mechanics programs, the need for highly qualified, agriculture mechanics teachers in the U.S. In addition, a nationally recognized list of agricultural mechanics skill competencies for new agricultural education teachers should be developed.

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Factors Motivating Members of a Farm Bureau in a Southern State to Participate in the Policy Development and Implementation Process

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Introduction

The decline of civic engagement over the last few decades in America and worldwide has become a growing concern (Putnam, 1995). Research has shown that a lack of civic engagement, where political efficacy is formed (Leighly, 1991), can result in an eventual distrust of government institutions (Bowler & Karp, 2004). The perpetuating and revolving nature of participation in political activities combined with the need for trust in government (Putnam, 1995), calls for an understanding of the factors which can counter this growing mistrust, thus overcoming political inactivity. Currently, the majority of studies looking at participation motivation have focused on participation in general areas of an organization. Theses studies have not identified specific factors that may influence participation in one sect of an organization versus another.

The purpose of this research is to ascertain the specific factors, which motivate certain members of Farm Bureau in a southern state to participate in the policy development and implementation process. Specific objectives of this study are to:

(1) Determine the perceptions of Farm Bureau members as they relate to Farm Bureau's organizational policy development efforts.
(2) Determine the perceptions of Farm Bureau members as they relate to their personal ability to make an impact on Farm Bureau's policy development efforts.
(3) Determine differences which exist among Farm Bureau members related to Farm Bureau's policy development efforts.
(4) Determine differences which exist among Farm Bureau members related to personal impact on Farm Bureau policy development efforts.

Theoretical Framework

The framework used for this study was Vroom's Expectancy Theory of Motivation (1964). The theory states that individuals make choices based upon the alternative, with the purpose of maximizing the positive and avoiding perceived negatives (Montana & Charnov, 2008). The development of Vroom's expectancy theory of motivation was centered on the need for a greater understanding of employee performance and motivation (Montana & Charnov, 2008). While the theory was created for its application to work performance and management scenarios, it is applicable to other domains, though little has been done to expand its uses (Vroom, 2005). These untested areas include the political, academic, nonprofit and nongovernmental sectors (Lawler & Suttle, 1973), where participation is often voluntary, making the need for understanding motivations ever present.

Methodology

This quantitative study was descriptive in nature with the intent of providing a detailed analysis of the factors that motivate members of a Farm Bureau in a southern state to participate in the policy development and implementation process. The researchers used a convenience sample of active farm bureau members in a southern state, defined by the organization as any due-paying, debt-free individual involved in the production of agriculture or agricultural products (Farm Bureau, n.d.).

Using the Tailored Design Method (Dillman et al., 2009) a mailed questionnaire was administered to all active members of a Farm Bureau in a southern state (n = 25,000). Specific data was collected in three sections regarding policy development, policy implementation, and industry affiliation; additional questions regarding demographic information were also included. To address non-response, the researcher compared early and late respondents using a chi-square test. Various statistical analyses were used to report findings on the four objectives of the study.

Findings

The respondents included active members of a Farm Bureau in a southern state. Using a range of one to four (1 = "Not at all aware" and 4 = "Very Aware"), the responses (n = 1668) indicate that members of the Farm Bureau are moderately aware of the Farm Bureau's policy development efforts (M = 2.39, SD = .891) reporting on objective one. For objective two, members also reported (n = 1707) having only a moderate impact on the Farm Bureau's policy process (M = 2.2853, SD = .96238). A difference among the members' political awareness of the Farm Bureau's policy process and their impact on the Farm Bureau's policy process was found to be significant reported by a $p < .05$, set *a priori*. A t-test was used to analyze objective three to determine if differences existed among Farm Bureau members related to Farm Bureau's policy development effort with $t = 109.76$ (df = 1667, $p < .05$). Significant differences were also found to exist among Farm Bureau members related to personal impact on Farm Bureau policy development efforts with t = 98.110, (df = 1706, $p < .05$) in an analysis of objective four.

Conclusions

Moderate awareness of the Farm Bureau's development of policy and moderate feelings of impact of on the policy process indicate other factors are contributing the members' lack of participation. It is clear that members have some level of awareness of the Farm Bureau's policy process. Members also report feeling some level of impact on the policy process. It is unknown what additional factors are contributing to a lack of engagement in the policy process. As noted in the literature, individuals make decisions based on the perceived benefits of the choices (Vroom, 2005). Because the Farm Bureau members do not perceive any impact on the policy process, the option of non-participation holds greater value; therefore avoiding the negative of giving effort and having no impact.

Implications

As Florida's agricultural population becomes increasingly diverse the need for a sundry of voices and opinions in the policy development and implementation process is essential to ensure that all sectors of the industry are represented on local, state and federal levels. Findings

from this study will serve a guide to learn from and target those specific motivators to encourage a balanced policy process. Understanding the factors that motivate action can also be used to regain trust, which Putnam (1998) says is necessary for meaningful and lasting civic engagement. Furthermore, because of the self-realization aspects of political activities, participation will be revolving and sustained (Leighly, 1991). Also, findings from this study can be extended to other grassroots and NGO organizations for the purposes of recruiting participation. Lastly, this study will generate suggestions for similar organizations with feedback of the "hot issues" in the industry, members' perceptions towards those issues, and what steps can be taken to deal with those issues.

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Identifying the Preferred Leadership Style of Secondary Agricultural Educators

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Introduction/need for research

The term leadership is widely used throughout society—in formal and informal settings and in nearly every context imaginable. No doubt, people are intrigued by the concept of leadership; yet, for many, it is an ever elusive idea that is hard to define, describe, and develop. Agricultural educators are expected to develop leadership in their students; in fact, both the agricultural education and FFA missions call for leadership development in students. However, before agricultural educators can effectively develop leadership in their students, they must first identify and understand their personal leadership style (Bass & Avolio, 2004).
Little is known about the preferred leadership style of secondary agricultural educators, especially at the national level. One study, by Greiman, Addington, Larson, and Olander (2007) showed that Minnesota agricultural educators are "more transformational in their preferred leadership style in contrast to transactional and laissez-faire styles" (p. 100). More research is needed to determine the leadership style of agricultural educators nationwide.

Leadership of agricultural educators is too important a topic to overlook; Hall, Briers, and Rosser (2009) identified a plethora of literature indicating that "the leadership experiences of the teacher have a positive influence on program quality and leadership development of students" (p. 2). Identifying and understanding the leadership style of agricultural educators is a crucial step for enhancing the leadership of teachers and, ultimately, of their students.

Conceptual or theoretical framework

According to Hall, Briers, and Rosser (2009), the profession has not identified or adopted a leadership model for agricultural educators. However, the transformational leadership approach has been studied in numerous contexts ranging from military to church settings and governmental to educational agencies to identify a range of highly effective to ineffective leaders (Bass & Avolio, 2004). In a study of agricultural educators, Greiman et. al (2007) wrote that "the transformational leadership style preferred by teachers might be advantageous when confronted with issues in the school environment" (p. 101). The transformational leadership model was used to conceptualize leadership of agricultural educators in this study.
The Full Range Leadership Model by Bass and Avolio (1994; 2004) incorporates nine leadership factors: five transformational factors, three transactional factors, and one laissez-faire factor. *Idealized Influence (attributed), Idealized Influence (behavior), Inspirational Motivation, Intellectual Stimulation,* and *Individualized Consideration* are the transformational factors. The

transactional factors are *Management-by-Exception (active), Management-by-Exception (passive),* and *Contingent Reward*. The concept of transformational leadership differs from many leadership models in that leader and follower are inextricably bound to reach performance beyond expectations (Bass & Avolio, 2004).

Methodology

The researchers conducted a pilot study with agricultural education teachers from California, Florida, Georgia, Ohio, and Texas. The frame for the study was created from a National FFA contact list and the agriculture teacher directory for each state. The data collection instrument comprised two parts: the Multifactor Leadership Questionnaire 5X short form (MLQ) (Bass & Avolio, 1995) and a section for demographic information. The instrument was examined for content and face validity by an expert panel; changes were made as suggested. The instrument was put online using SurveyMonkey®. Kiernan, Kiernan, Oyler, and Gilles (2005) found that "a Web survey appears to be as effective as a mail survey in the completion of quantitative questions that measure knowledge, attitudes, behaviors, and intentions" (p. 250). Participants received an email cover letter and a web link to access the questionnaire. SPSS© was used to analyze data, using descriptive statistics as appropriate.

Results/findings

Of the 50 agricultural educators randomly selected nationally, 31 responded. The preferred leadership style of the agriculture teachers is shown in Table 1.

Table 1. Leadership Styles and Factors of Agricultural Educators, Norms, Means, and SDs

Leadership style and factors	μ(Norm)	σ (Norm)	*M*	*SD*
Transformational			3.30	.40
Idealized Influence (attributed)	2.95	.53	3.24	.46
Idealized Influence (behavior)	2.99	.59	3.22	.62
Inspirational Motivation	3.04	.59	3.41	.55
Intellectual Stimulation	2.96	.52	3.00	.56
Individualized Consideration	3.16	.52	3.60	.40
Transactional			2.00	.38
Contingent Reward	2.99	.53	3.20	.40
Management-by-exception (active)	1.58	.79	1.58	.62
Management-by-exception (passive)	1.07	.62	1.19	.60
Laissez- faire	0.61	.52	0.76	.52

Note. Sale: 0 = not at all, 1= once in a while, 2 = sometimes, 3 = fairly often, 4 = frequently, if not always

Conclusions

Agricultural educators are more transformational in their preferred leadership style in contrast to transactional and laissez-faire styles. In addition, agricultural educators scored higher

than the norm on each of the transformational factors and slightly higher than the norm on the transactional and laissez-faire factors. The findings were consistent with the work of Greiman, Addington, Larson, and Olander (2007) in terms of the level at which agricultural educators prefer transformational, transactional, and laissez faire styles of leadership.

Implications/recommendations/ impact on profession

As a result of this study, the preferred leadership style of a small number of agricultural educators across the nation has been identified. Identifying the preferred leadership style of a large number of agriculture teachers across the country would provide data that could be generalizable across the profession. In addition, future studies that would determine the impact of transformational agricultural educators on students would be beneficial. This study as well as Greiman et. al (2007) show that agricultural educators perceive their leadership style to be transformational. Understanding one's leadership style is extremely valuable and a prerequisite to developing leadership in others.

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Integrating Research-Based Knowledge Objects into Academic Program Evaluation

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Introduction/Need for Research

A graduate degree in higher education gives students a strong background rooted in research, teaching, theory, and practice with an emphasis on becoming leaders in their field of expertise. However, Graham noted "for more than a decade, employers have expressed a concern for the lack of graduates sufficiently trained to meet the challenges of a high-performance workplace" (p. 89). Academic departments must increase their accountability by assessing the competencies of their graduates to ensure they are prepared to transition into the workplace.

Conceptual or Theoretical Framework

Shinn, Briers, and Baker (2008) identified five categories of knowledge objects that a well-prepared agricultural education doctoral student should be competent in upon graduation: (a) planning and needs assessment, (b) research methods and tools, (c) scholarship and writing, (d) history, philosophy, and ethics, and (e) context, culture, and diversity. The purpose of this study was to use the knowledge objects identified by Shinn et al. to measure graduates' self-perceptions of their learning upon completing a graduate degree in agricultural education.

Methodology

Graduate faculty at a Research I university developed a graduate student exit survey instrument as a part of on-going departmental efforts to provide a quality graduate program for students whose interests lie in the broad realm of agricultural education. Graduating students

were invited to complete an online questionnaire hosted by Survey Monkey. The instrument contains five sections: research opportunities, academics, career guidance, departmental support and career expectations, and personal characteristics. The items in the academics section are the focus of this poster. Permission was granted to replicate and modify the knowledge objects for inclusion in the exit survey. Participants used a five-point scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) to indicate their level of understanding for each item. Scale reliabilities ranged from α = .61 (context, culture, and diversity) to α = .94 (planning and needs assessments).

Results/Findings

Thirty (75.00%) graduate students completing degrees during the spring, summer, and fall 2008 and spring and summer 2009 semesters participated in the study. There were 6 doctoral candidates, 7 Master's thesis students, 5 Master's non-thesis students, and 12 distance-delivered Master's (DDMS) students. Table 1 displays the means for the knowledge objects within each academic subsection. They have been presented by degree program to facilitate comparison across academic levels.

Table 1
Means for Academic Subsections by Degree Program

Subsection	Ph.D.		MS Thesis		MS Non-Thesis		DDMS	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Planning and needs assessment	3.61	.68	3.62	.49	3.27	.43	3.92	.29
Research methods and tools	3.50	.47	3.54	.63	3.25	.35	3.72	.38
Scholarship and writing	3.54	.33	3.68	.35	3.85	.34	3.71	.44
History, philosophy, and ethics	3.53	.41	3.90	.37	3.83	.29	3.79	.31
Context, culture, and diversity	3.61	.44	3.90	.32	4.00	.00	3.86	.33

Note. Scale: 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Agree*, 4 = *Strongly Agree*, 5 = *Not Applicable*.

Conclusions

Students in every degree program tended to strongly agree they understood the knowledge objects within the scholarship and writing; history, philosophy, and ethics; and context, culture and diversity academic subsections. Students in every degree program *except* MS non-thesis tended to strongly agree they understood the knowledge objects in the planning and needs assessment, and research methods and tools academic subsections. MS non-thesis students tended to agree they understood the knowledge objects within those areas.

Implications/Recommendations/Impact on Profession

The study is limited by the small population. However, the findings indicated students perceived themselves to understand the knowledge objects identified by Shinn et al. (2008). The resulting implication is that the department's graduate degree programs are providing the types of experiences necessary to help students construct knowledge in the academic subsections studied.

Agricultural education departments differ in their graduate degree programs. Some offer doctoral, Master's, and distance programs, while others offer only Master's or distance programs. While Shinn et al. (2008) identified knowledge objects for doctoral students, more research is needed to address the appropriateness of these objects for Master's and distance students. Additional research should also examine the factors affecting perceived knowledge gained so that departments can focus on what is important.

Utilizing research-based knowledge objects to measure graduate students' self-perceptions after they complete their degree will allow agricultural education departments to evaluate their graduate programs, identify weaknesses in the curriculum, make changes, and continually improve the graduate student experience. Doing so will help to ensure the provision of quality academic programs for current and future students.

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Research Poster Narrative Proposal

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Perceptions of Instructional Methods in Biofuel Education of Secondary Students

Introduction

In recent years there has been a concern of diminishing petroleum reserves and future energy supplies (Akbas & Ozgur, 2008; Vasudevan & Biggs, 2008). Biodiesel is an efficient, renewable, biodegradable and 100 percent natural energy alternative to petroleum fuels (Akbas & Ozgur, 2008; Vasudevan & Briggs, 2008). Adequate curriculum should be developed and presented to students in order to impact their learning. According to the National Research Agenda (2007), there is a need to "systematically identify and develop instructional systems to meet industry needs" (p. 19).

Theoretical Framework

Lecture is the most common method of passing on information to students (Kindsvatter, Wilen, & Ishler, 1992; Waldron & Moore, 1991). Lecture method instruction allows for large concepts and ideas to be communicated to the student in a relatively short period of time. "Demonstrations have served as one of the most effective education tools ever developed" (Seevers, Graham, Gamon, & Conklin, 1997, p. 145). A demonstration allows students to see how something works or is used, operated, or performs (Kindsvatter et al., 1992; Phipps et al., 2008). Tinkering self-efficacy is a person's experience, competence, and comfort with manual activities (Baker & Krause, 2007).

Methodology

The purpose of this study, which was part of a larger study, was to determine if the [state] Secondary Biodiesel Education Program ([state] SBEP) over alternative fuels had an effect

towards student interest. This study evaluated students' interest in the two methods used to present the ([state] SBEP), lecture and demonstration. Additionally, this study also sought to find if knowledge acquisition was correlated to students' tinkering self efficacy. This study sought to address the following hypotheses:

Ho_1: There will be no significant difference in student interest of presentation method after completion of the [state] Secondary Biodiesel Education Program.
Ho_2: There will be no significant correlation in students tinkering self efficacy and posttest knowledge scores.
Ho_3: There will be no significant correlation between students tinkering self efficacy and method used through biofuel education.

The instrument developed for this study was constructed from an intense literature review and measures the main construct found in the curriculum of the ([state] SBEP) over alternative fuels. The instruments development was also guided and reviewed by a committee of experts for face and content validity. The instrument was made up of two sections, a pretest and a posttest.

Findings, Conclusions, and Recommendations

By class, pretest knowledge scores ranged from 4.15 to 6.20 on the 18 item test. Mean scores for the pretest 18 question knowledge section were 5.12, 4.15, 4.55, 5.60, 5.75, 6.11, 5.62, and 6.20 respectively. The theoretically derived means for all class was 4.5. The percentage of pretest scores did not differ from the theoretically derived mean of guessing, χ^2 (7, N = 91) = 2.24, $p > .94$.

Null hypothesis one was tested using *t*-test analyses. There was a significant difference between student interest in method of presentation, $t = -7.18$, $p < .05$ (.0002). Based on these findings, null hypothesis one was rejected. Null hypothesis two showed a strong positive correlation of .73 between posttest scores and student tinkering self efficacy. The t value (t = 8.29, $p < .0001$) was significant at the .05 level and had an r^2 value of .53. Null hypothesis two was rejected. Null hypothesis three displayed a significant positive moderate correlation (Davis, 1971) between the two methods of instruction. Analysis of the upper and lower quartile of participants with respect to tinkering self efficacy and method of instruction revealed t (41) = -2.58 and p = .01. Null hypothesis three was rejected.

Through analysis conducted in this study, it is apparent that correct knowledge held by participants about biofuel is negligible. Data indicated knowledge held is low thus demonstrating the need for education about biofuel (Acker, 2008). It was found that students (N = 91) who held a positive tinkering self-efficacy score was positively correlated to post-test scores (r = .73) through the ([state] SBEP). Based on the high value of the Pearson Correlation Coefficient (r = .73), teachers should consider this finding when teaching based on factors noted in this study.

Findings of this study revealed that students tinkering self efficacy positively affected their perceptions towards method of instruction. Students with high tinkering self efficacy preferred the use of a demonstration method in the context of this study. Recommendations based on the findings of this study include using the demonstration methods when presenting

material when deemed appropriate to gain student interest. This recommendation is further refined to include areas of study when classroom participants are heavily weighted towards male percentages based on their tinkering self-efficacy preferences.

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Selected Demographic and Personal Characteristics of Secondary Agricultural Education Teachers in Texas

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Introduction

Changing demographics in public schools across the country has had a profound effect on the agricultural education profession, as national organizations like FFA, and The National Council for Agricultural Education realize that tomorrow's teachers of agricultural education will be from a wide range of individuals from different ethnic, racial, cultural, and societal backgrounds. Because of this impact, the field of agricultural education has been charged with meeting the needs of our society and, in turn, ensuring that the profession is more applicable to a wide range of people. Teachers of agricultural education must be prepared in terms of philosophy, pedagogy and curriculum to deal with the challenges of an increasingly diverse population and actively work on preparing this population to navigate the waters of agricultural education successfully. This study sought to describe selected demographic and personal characteristics of [State] secondary agricultural education teachers employed in public schools.

Conceptual Framework

The conceptual framework that guided this research was based upon the concept of diversity inclusion. Diversity inclusion is an educational philosophy that welcomes all learners by actively engaging them in educational programs regardless of their race, ethnicity, or exceptionality. A diversity inclusive program is where the critical infusion of multicultural education, inclusion, and culturally responsive teaching takes place. Teachers and programs that exist within this area have positive perceptions about (a) the benefits of diversity inclusion; (b) understanding that, because of past perceptions, pre-existing barriers may be reason why students of color and students with disabilities are underrepresented in agricultural education, and (c) having an awareness of possible solutions to increase underrepresented group participation in agricultural education.

Methodology

This purpose of this study was to explore and analyze secondary agricultural education teachers' attitudes toward diversity inclusion in secondary agricultural education programs. The target population consisted of all [State] secondary agricultural education teachers as listed by the [State] Education Agency (SEA) during the 2006-2007 school year (N = 1,732). A nonproportional stratified random sampling technique was employed to determine the levels of subgroups within the sample to be selected. The researchers decided that all 10 administrative areas as defined by the [State] FFA Association would be proportionally represented in the study. Within each administrative area, 32 teachers were selected randomly (n = 320). Sample size was determined using a sampling formula from Bartlett, Kotrlik and Higgins (2001).

The questionnaire used in this study was based on previous work by Warren and Alston (2007) concerning diversity and inclusion perceptions of North Carolina agricultural education teachers. Survey implementation and data collection methods followed Dillman's (2007) *Tailored Designed Method*. A panel of experts with expertise in diversity and inclusion established content and face validity. To address nonresponse error, the researchers compared respondents to nonrespondents by comparing participants who completed the questionnaire before the deadline (n = 195) to those that completed the questionnaire after the closing date (n =

37) (Lindner, Murphy, and Briers, 2001). The final response rate after controlling for response error was 72.5% (n = 232).

Findings

Approximately 79% of the respondents were male while females constituted 21% of the participants in the study. The average age of participants was 39 years old (SD=10.72). Nearly 61% of secondary agricultural education teachers had 15 or less years of teaching experience. Approximately 32% of secondary agricultural education teachers indicated that they received some form of diversity/multicultural training during their undergraduate matriculation. Conversely, 47% of participants indicated that they received some form of diversity/multicultural training outside of a college/university requirement. A large percentage (63%) of participants indicated that their school was located in a rural setting. The second largest percentage in the school setting was suburban (22%). Approximately 91% (n = 191) of the respondents indicated that they were White/European American while the second largest percentage (6%) of respondents identified themselves as Hispanic/Latino Americans (n = 13). Four (2%) participants identified themselves as Native Americans while less than 1% of the sample identified themselves as either African American (n = 2) or Asian American (n = 1).

Conclusions/Implications

Generally, a diverse demographic and personal characteristic difference exists between secondary agricultural education teachers within [State]. The gender representation of participants reflected a similar representation of gender as reported by the [State] Education Association (SEA, 2008a). Based on the findings in the study, the researchers suggest that preservice teacher education programs need to incorporate a greater focus on the aspects of the courses that will provide preservice teachers with diversity/multicultural training at the undergraduate level to ensure that agricultural educators are prepared to deal with the challenges of a diverse student population. Data of demographic trends in public schools imply that this type of training is warranted (SEA, 2008b). If agricultural educators are to stay abreast of the demographic shift occurring in public schools, diversity and multicultural education courses must be a vital part of the undergraduate curriculum.

Respondents in this survey were more than likely to have received diversity/multicultural training outside of a college or university requirement. One implication from this finding is that secondary schools are making conscious efforts to provide diversity/multicultural education to agricultural education teachers. Based on the implication, deliberate efforts should be made to examine the depth at which local schools implement diversity/multicultural training to secondary agricultural education teachers.

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The Facebook Factor: Social Media in a Graduate Course

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Introduction

Social media, which is Web content that is viewed and changed by its users (Comm, 2009), has exploded over the past five years. One of the more well-known social networking sites, Facebook, has over 350 million members worldwide (Press Room, n.d.). It can only be expected that social media will dip its toes into the educational waters. But how are students going to react to a change in class norms?

Theoretical framework

Expectancy Violations Theory (EVT) is the guiding concept of this study. EVT is relevant any time individuals are interacting with each other and Individual A deviates from what Individual B is expecting (West & Turner, 2007). Individual B interprets the violation as good or bad depending on what the actual violation was, the characteristics of the violating individual, and the context of the violation. In the case of social media in class, this new media has typically been for personal use, so there is a risk that students might not be receptive to changing the way things are done to accommodate this new and probably personal media.

Methodology

The purpose of this study was to assess students' opinions of the integration of Facebook into required course work for a graduate course in leadership. It was required for students in the class to post discussion questions related to the weekly lectures on Facebook before each class. Students were asked what their overall impression of using Facebook, how they felt it changed discussions, how it changed their overall learning, and how using Facebook compared to using the university's official course management system that could have accomplished the same task. There were 12 participants in this study. They ranged in age from 22 to 44, with all but two being 26 or younger. Nine participants were master's students and three were PhD students, and all were full-time students. The instructor was asked questions related to why Facebook was used

to facilitate online discussions instead of the official course management system. This was the instructor's third time to teach the course.

Results

The instructor made the switch based on the perspective of the students and the instructor. The instructor had not had good experiences with the university's official course management system. The university also had a lot of turnover in course management systems. The current system had only been in place for two years at the time of the study and was going to be replaced the next year. The instructor also liked the ease of access that Facebook provided. The majority of students have Facebook accounts and can be accessed from any computer with Internet access. One of the other benefits related to open access was for outside presenters to see students' discussion questions, which would be more difficult with the university's course management system. Aside from a slight problem in the first week, the instructor felt the implementation of Facebook had gone well and they would use it again.

Most participants liked using Facebook for class discussion, but there were negatives relating to getting distracted one the site. A couple of respondents didn't like using what they felt was a personal Web site for class. The participants were pretty split on whether discussions were made better or worse by Facebook, though responses tended to relate more to how the discussions were executed by other students, good or bad. None of the participants felt that using Facebook had hurt their overall learning in the class, but less than half felt their learning was enhanced because of it. Most felt Facebook was better than E-learning would have been, typically because Facebook was seen as more user-friendly.

Conclusions/Recommendations

Overall, the implementation of Facebook as a means of discussion for the course went well. This could be due to students not being expected to go beyond the most basic Facebook function of being able to post on a discussion board. While the participants held a generally positive view of Facebook for the class, there were some issues, but many of these issues dealt more with how students, including themselves, were using Facebook for discussions. These issues could have just as easily occurred on any online medium for class discussion. There also appeared to be violations that occurred in regard to using what a couple of participants felt was a personal medium in education.

As with any tool or activity used for class, there were mixed results. While the majority saw this use of Facebook in a good light, there were still issues involved. In the end, the reaction to anything new being introduced to a class of students is going to depend on the students' expectations and how the teacher implements it. In this case, the teacher implementing Facebook had a personal account and was aware of how to use the site. Based on this research, when considering what tool to use for class, instructors should understand how they and their students will use it. In this instance, the instructor was aware of both the instructor's and students' involvement with Facebook and believed the transition of using Facebook as an interactive tool would be easy for students. Future research should look at different social media and different students to see if similar results occur.

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The Impact of Cognitive Load On the Critical Reflection of Pre-service Teachers

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Introduction

Reflection has become a vital component in teacher preparation programs nationwide, and for good reason (The Association of Teacher Educators, 2003; Hatton & Smith, 1995). The process of reflection has been described as a beneficial practice for teachers, and reflection has been identified as an "academic virtue and source of privileged knowledge" (Fendler, 2003, p. 16). Additionally, teacher education literature emphasizes the need for reflection of pre-service teachers (Howard, 2003).

Pre-service teachers participate in a variety of reflective activities throughout their teacher preparation program including reflective journaling, peer teaching demonstrations, case studies, and action research projects. The benefits of critical reflection have been researched and documented. Specifically, critical reflection is a method that can increase the frequency of higher-order thinking questions (Epler & Broyles, 2008). Additionally, video technology has been described as useful tool for self-reflection that promotes teacher development and is an appropriate method for self-reflection (McCurry, 2000; Ovens & Tinning, 2009). Even so, it is important to consider the nature of reflective experiences. Are reflective experiences constructed

in a manner that maximizes depth of thinking and ultimately higher-level learning? Does critical reflection ultimately lead to a change in teaching behaviors and skills?

Theoretical Framework

When examining pre-service teacher critical reflection, researchers must consider cognitive load theory (CLT). Cognitive load is defined as a "multidimensional construct representing the load that performing a particular task imposes on the learner's cognitive system" (Paas, 1994, p. 353). Cognitive load theory assumes that the human cognitive architecture includes a very limited working memory. In fact, according to Peterson and Peterson (1959), "without rehearsal, information in working memory is lost within about twenty seconds" (p. 198). Cognitive load is a crucial factor in the learning of complex tasks. In most cases, cognitive load is not viewed as a mere by-product of learning, but plays a major role and quite often, determines the success of instructional interventions (Paas, Touvinen, Tabbers, & Van Gerven, 2003). High cognitive load can even have negative impacts on learning.

Based upon cognitive load theory, a review of critical reflection methods used in a teacher preparation program is necessary. Are reflective experiences for pre-service teachers designed with cognitive load in mind? Do reflective experiences that create higher cognitive load impact (or even negate) the learning that can occur through reflection? The overall objective for this exploratory study was to describe if an increase in cognitive load impacts the critical reflection experience of pre-service teachers.

Methodology

Twenty-eight Career and Technical Education (CTE) pre-service teachers were randomly placed into 14 teaching teams. The teams taught a pre-written lesson which was videotaped. After the lessons were taught, groups were asked to reflect upon their teaching while viewing the video. Seven groups were randomly assigned to an experimental group and the remaining seven assigned to the control group. The experimental group's self-reflection process was designed to create a higher cognitive load. The experimental group was asked to reflect on the frequency and cognitive levels of questions, ability to communicate with students, discussion techniques, and the ability to demonstrate flexibility (Danielson, 2007). The control group's self-reflection form focused only on the frequency and cognitive levels of questions. Participants also engaged in focus group interviews after the second round of teaching. Focus groups were designed to explore the participants' experiences during the reflection process.

Findings

A variety of themes emerged during initial data analysis from the focus group interviews. Specifically, the challenges of reflecting on multiple areas (higher cognitive load) emerged from the data. The pre-service teachers expressed that they were "focused on trying to get answers for all the different parts rather than really focusing...thinking critically." Additionally, the pre-service teachers found it difficult to reflect on multiple areas by watching their video only once because "to catch it all you're probably going to need to watch it four times." The pre-service teachers indicated the positive results of reflecting specifically on questioning. Asking pre-

service teachers to identify the cognitive level of questions "made Bloom's taxonomy real and meaningful." Thus, while reflection on multiple areas was difficult, the process did result in a change in their teaching behavior.

Conclusions

The findings indicate that cognitive load does have an impact on the critical reflection of pre-service teachers. In fact, when pre-service teachers are asked to reflect on multiple areas, the higher cognitive load can impact specific teaching skills. However, even though being asked to reflect upon multiple areas was difficult, the pre-service teachers in this study were able to consciously adjust their teaching and improve their lesson after the initial teaching round. If the cognitive load is decreased, it can be hypothesized that transfer of specific teaching skills would be increased as a result of the reflection process.

Recommendations

Based upon the findings of this study, the researchers recommend the following:

- Reflective experiences for pre-service teachers should take into consideration cognitive load and must have a clear purpose and objective. If not, pre-service teachers may experience higher cognitive load decreasing the effectiveness of the reflective experience.
- Reflective experiences of pre-service teachers should not be overwhelming and need to be designed to decrease the cognitive load. Pre-service teachers should not be asked to reflect upon multiple constructs of teaching at one particular time.
- A follow-up study should investigate the impact cognitive load has on the transfer of specific teaching skills from critical reflection. The study should examine the number of constructs to be included in reflective experiences in order to optimize transfer of skills.

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The Relationship of Motivational Orientation Constructs on Adult Participation in the Cooperative Extension Master Gardener Program

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Introduction/need for research

Extension's educational programs are available to anyone who wishes to participate. The Master Gardener Program enables adult participants to assist the local Extension agent with questions from homeowners and educate clientele through the use of demonstration gardens (Reiners, Nichnadowicz, Nitzsche, & Bachelder, 1991). A straightforward explanation does not exist as to what motivates adults to volunteer for the Master Gardener program (Flagler, 1992). Researchers should attempt to develop an understanding of which motivations correlate with one another in order to better answer why adults participate in the Master Gardener Program. Swackhamer and Kiernan (2005) recommended Extension utilize trained Master Gardeners in as many volunteer opportunities as possible for several years in order to get a good return on their investment.

Theoretical Framework

The theoretical framework of this study was based on Houle's (1961) Typology. Houle outlined three separate classifications that described the motivations of adults to participate in continued learning. The classifications were based upon adults' purposes and values of education. The three classifications were goal-oriented, activity-oriented and learning-oriented (Houle). Goal-oriented adults participate in an educational program due to the realization of their need for education or because they have identified a personal interest they want to comprehend to a higher degree. An activity-oriented adult chooses an educational program based upon the amount of social experiences with other adults (Houle). Adult who are learning-oriented perceive continued learning as a duty, and believe pursuing education will enhance their lives.

Methodology

The portion of the study reported here is focused on the motivational orientations of Master Gardeners. Quantitative research was selected as the research design for this study. It was a descriptive study using a census of participants from one county's Master Gardener Program in [State]. The researchers utilized the methods outlined by Dillman, Smyth and Christian (2009) to increase response rate from participants when instituting a mail questionnaire. Eighty-nine participants were surveyed, and sixty-six participants returned their completed survey to the researchers. Thus, the response rate was 74%. Forty-six percent of respondents were 56 years of age or older.

The questionnaire included forty-three statements from Mergener's (1979) Education Participation Scale and ten questions about participant demographics. Mergener's Education Participation Scale was derived from Boshier's (1971) Education Participation Scale, which was derived from Houle's (1961) Typology. The constructs within Mergener's Education Participation Scale were Competence related Curiosity, Interpersonal Relations, Community Service, Escape from Routine, Professional Advancement, and External Influence. The Competence related Curiosity construct aligned with the learning-oriented adults. The Interpersonal Relations and Community Service constructs aligned with activity-oriented adults. The Escape from Routine, Professional Advancement and External Influence constructs aligned with the goal-oriented adults.

Findings

The study's objective was to describe any existing relationships between motivational orientations for adults participating in the Master Gardener Program. Professional Development and an External Influence had a very strong association in this study $r(61) = .000$, $p < .01$ (Davis, 1971). Other constructs indicated a strong correlation, Interpersonal Relations and External Influence $r(61) = .000$, $p < .01$, Escape from Routine and External Influence $r(61) = .000$, $p < .01$ and Interpersonal Relations and Community Service $r(61) = .000$, $p < .01$.

Conclusions

Professional Development and External Influence were correlated in this study. However even though Professional Development and an External Influence had a strong relationship, forty-six percent of respondents were 56 years of age or older indicating that either construct may not have been as vital for their personal situation. The goal-oriented construct, External Influence, had substantial relationships between the activity-oriented constructs Interpersonal Relations, and Escape from Routine.

Implications/Recommendations

Extension agents that serve as Master Gardener Coordinators can use this information to understand what does and does not motivate older adults to participate in the Master Gardener Program (Flagler, 1992). The goal-oriented External Influence construct was at least

substantially correlated with three other constructs from different motivational orientations for participating in the Master Gardener Program (Houle, 1961).

The findings suggest participants can overlap between motivational orientation constructs. This implies that Master Gardener Coordinators should consider promoting their program to adults in all three motivational orientations due to adult characteristics overlapping among the three orientations. This study was descriptive in nature and, therefore, additional research on Master Gardener participation is needed to determine if substantial to strong associations exist among varying motivational orientation constructs associated with Houle's (1961) Typology on characteristics of Master Gardener participants. Developing an understanding of the associations among constructs may assist Cooperative Extension in retaining high quality Master Gardeners as volunteer educators in order for the organization to reap a high quality return on their initial investment, as recommended by (Swackhamer & Kiernan, 2005), on adult participants.

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Research Tips from the Trenches: Teaching Advice for Beginning Academics

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Introduction/Need for Research

Whereas many professions require on-the-job training or orientation, academic life assumes new faculty members have the skills, knowledge, and ability for on-the-job success when they arrive (Lucas & Murry, 2007). However, the transition from graduate students to new faculty members can reveal issues about their new employment situations and roles as educational professionals (Bowen & Schuster, 1986). Pressure to obtain grants, to develop a research agenda, and to advise undergraduate and graduate students might discourage new faculty interest in teaching (Cooper, 1980). The National Research Agenda for Agricultural Education and Communications recognizes the need for enhancing the effectiveness of agricultural and life sciences faculty as a research priority area (Osborne, n.d.). Since achieving success as a faculty member can be a challenge, universities are developing interventions (e.g. sabbatical programs, development activities, workshops, orientations) that contribute to faculty success and retention. This research contributes to the scholarship of teaching and learning knowledge base and provides teaching advice that can assist both graduate students and new faculty members as they develop their academic careers.

Theoretical Framework

The study was theoretically framed around andragogy, which is concerned with helping adults learn (Cross, 1981). More specifically, Knowles (1978) provides five assumptions of adult learners that could apply to college faculty who work on developing their instructional skills: self-concept, experience, readiness to learn, time perspective, and orientation to learning. As individuals mature, their self-concept changes from dependency to self-directedness because they gain experience and their readiness to learn is more focused on developmental tasks for their social roles. Adult learners are motivated to learn in order to address problems.

Methodology

A qualitative research design was used for this study. Researchers purposively selected six tenured faculty members of a southwest university's Teaching Academy to participate in semi-structured face-to-face interviews. The six Teaching Academy members were recognized by their colleagues for demonstrating excellence in teaching. Each participant represented a

different academic department at the university. The purpose of the study was to gather advice from these tenured faculty members that would benefit graduate students and new, or junior, faculty. The interviewer engaged participants with probing questions to explore emerging themes during interviews. The interviews were digitally recorded to ensure dependability (Guba & Lincoln, 1989). Recordings were transcribed and analyzed for emerging themes, similarities, and dissimilarities. Data were analyzed using Glaser's constant comparative method (1978) to analyze responses between participants. This method allows researchers to identify patterns or relationships within the data. Participants' responses were used to draw conclusions and recommendations.

Findings

Eleven best lessons emerged from the interviews with tenured Teaching Academy participants:

1. Seek out a mentor among the seasoned faculty in your department to learn as much as possible.
2. Determine who are among the best professors in your discipline and observe their classroom instruction.
3. Plan and rehearse lessons plans, so you are confident in your instructional approach.
4. Try multiple teaching strategies to learn what fits your style and personality the best.
5. Present information in multiple ways by using different learning modalities (audio, visual, kinesthetic) to help students understand the material.
6. Follow good instructional design (set objectives, determine teaching material, design classroom activity, and complete evaluation of learning outcomes).
7. Have students complete mid-term evaluations as a formative assessment of the professor's teaching.
8. Make student learning meaningful by connecting new information to their existing knowledge base.
9. Provide active learning opportunities in small and large lectures through in-class activities (e.g. think-pair-share, case studies, class discussion, clicker questions, simulations).
10. Develop rubrics as a tool for grading assignments.
11. Grade assignments or exams question by question to maintain consistency in point values.

Conclusions

Participants found value in working with a mentor and observing good professors within their disciples to help them develop their teaching skills. Graduate students and new faculty were encouraged to try multiple teaching strategies to learn what instructional approaches fit their personality and style. Using multiple teaching strategies for reaching the different learning modalities can help students learn. One way to incorporate different teaching strategies is through the use of small group and class discussions, clickers, or case studies. Additionally, confidence in their ability to teach emerged as these participants spent time planning and

rehearsing their lessons plans. Mid-term evaluations by students would further help professors or graduate students assess their teaching.

Implications/Recommendations

Graduate students and new faculty could be viewed as independent, adult learners who are motivated to apply new teaching strategies that benefit their roles as professors. The list of lessons learned from tenured faculty provides suggestions for graduate students and faculty as they search for ways to improve their teaching skills. Departments should provide opportunities for graduate students and new faculty to learn about, implement, and evaluate teaching strategies in their own classrooms. Studies could determine whether these suggestions would lead to greater competence, greater confidence, and less faculty turnover.

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Utilizing Virtual Field Trips in Preservice Teacher Education

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Introduction

Teacher preparation programs frequently employ clinical experiences and school visits as methods of effectively preparing pre-service teachers. Interviews of both college students and inservice teachers have found "clinical experiences to be the most strongly approved portions of teacher education programs" (Zeichner, 1980). Additionally, some of the reform directing the future of agricultural education teacher preparation relates to the time devoted to field-based experiences (Connors and Mundt, 2001). For these reasons, many teacher preparation programs require early field experiences throughout their preservice teachers' academic programs (Zeichner, 1980). In Connors and Mundt's study performed in 2001, the majority of agriculture teacher preparation programs were reported to require some form of early field experience before student teaching. Because middle and high school agriculture programs differ greatly by school, the benefits of multiple field experiences for pre-service teachers are numerous. However, barriers including preparation and planning time (Lacina, 2004), funding, scheduling conflicts, and distance limit the number of agriculture program visits teacher educators can offer their students. A possible method to allow more observation of various agriculture programs while overcoming these barriers lies in virtual field trips, which provide access to places normally considered difficult or impossible for classrooms to visit (Lacina, 2004). Through the creation and utilization of virtual field trips in teacher preparation programs, preservice teachers can gain access to various schools and agriculture departments in their teacher education classes, while teacher educators save time and resources.

Steps

This innovative idea is currently being implemented in a southern state's land grant institution's agricultural education Early Experience Block, which contains 24 preservice teachers in their junior year of college. Each pre-service teacher is required to create a virtual field trip of the school/agriculture department in which they are currently completing 30 field experience hours. They were provided step-by-step instructions to create a virtual field trip using mapwing.com, a free virtual field trip creation site. Through this site, pre-service teachers create maps of schools and agriculture departments, display multi-direction views from various

points, showcase specific areas of interest, and guide visitors through the tour as if they were actually walking in the building. Each photograph is accompanied by comments that serve as the tour guide's explanation of what the tourist is viewing.

Once all virtual tours are completed, pre-service teachers direct their classmates through their field experience schools using the virtual field trip in a presentation. Student opinions regarding the creation of a virtual field trip and perceptions of the efficacy of using these field trips as a method of gaining access to multiple agriculture departments has been assessed. This assessment, along with the views of agriculture education professionals gathered through the presentation of this Innovative Ideas poster, serves to gauge the efficacy of the use of virtual field trips in this setting, as well as provide ideas for improvement for future years.

Results and Implications to Date

Initial observation of student reaction to the assignment was encouraging. Pre-service teachers expressed great interest in both creating virtual tours and taking on the role of "tourist" for their classmates' tours. Further, they had few initial questions regarding methods for creating the virtual tours. The implications for the utilization of virtual field trips to enhance student understanding of various agriculture departments are vast. The agricultural education programs that students experience increase greatly in number, and can become more diverse due to the elimination of geographical and time barriers. Pre-service teachers gain a larger appreciation for different aspects of all types of agriculture departments in both middle and high schools, perhaps even across state lines. These students can then utilize their education and these virtual field trips to gather a greater variety of tools and ideas to later utilize in their own classrooms. Students also gain a deeper understanding of the various components of their own field experience site by creating the virtual tour for others.

Advice to Others

Agricultural education professors at universities nationwide are encouraged to utilize virtual tours, through either a similar assignment or alternative methods, to allow increased opportunities for their pre-service teachers. These opportunities will eliminate geographical, resource, and time barriers so students can observe a greater variety of middle and high school agriculture departments, as well as experience more FFA events and SAE visits. In order to maximize the benefits of virtual field trips in the classroom, it is recommended that teachers take several virtual field trips prior to planning an assignment involving them, so they are familiar with the navigation and process of virtual tour design (Lacina, 2004). Through discussion and collaboration with others who are interested in further developing the use of virtual tours in the teacher preparation program, the benefits and methods of this innovative idea can gain greater clarification and merit.

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A Tool for Differentiation: Making Curriculum Accessible for All Students

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POSTER PRESENTATION:
Innovative Idea

Introduction

Differentiated instruction is a process that tailors instruction for all students in mixed ability classrooms. Tomlinson (2001) refers to differentiated instruction as a proactive, student-centered approach to learning that uses multiple types of instruction and multiple teaching methods to deliver effective instruction to all students. According to Sternberg and Zhang (2005) differentiated instruction allows students to explore their stylistic preferences and creates an environment more conducive to learning because they have the opportunity to engage in instruction that matches their learning style. Differentiated instruction can be helpful for students with special needs as well.

The expectation that all students will achieve encourages instructors to find ways to make their students successful. Differentiated instruction for students can make certain that the instruction fits each student's learning style and thinking style, which refers to how students

perceive, process, and think about the information presented to them (Sternberg & Zhang, 2005). The differentiated classroom can create an environment where diverse students' needs are met, academically gifted students are challenged, and students with learning disabilities needs are accommodated (George, 2005).

How it Works

While differentiating instruction may be effective in heterogeneous classes, it can be a difficult and time consuming process to make certain all variables of the differentiation process are considered. The Differentiated Instruction Checklist is an instrument that guides teachers through the process of differentiating instruction during the lesson planning process as well as guiding reflection after the lesson has been implemented. Before a lesson is to be taught the instructor will use the checklist to create objectives and differentiate them for students based on their achievement level. The checklist then guides the instructor through the pre assessment, active assessment, and post-lesson reflection. After the lesson the checklist provides a place for the instructor to reflect about what objectives were achieved, what worked well, and what changes can be made.

Implications

This checklist can be used by preservice teachers learning to plan effective differentiated lessons. Since the checklist includes listing objectives, and assessments at several levels, it could replace or complement the typical lesson plan templates used by preservice teachers. For inservice teachers, the checklist can serve as a tool to help them think about differentiating instruction for students in their classroom with special needs.

Future Plans

More research should be done to determine if the differentiated instruction checklist is useful for practitioners in the field. A study is in progress to determine the effectiveness of the Differenced Instruction Checklist as perceived by pre and inservice agricultural education teachers and teachers in other fields. Teachers should be trained on how to plan and effectively deliver differentiated lessons for students. The instrument is currently a paper based form. In the future the instrument could be made into an interactive form with drop down menus rather than check boxes.

Costs

The cost of the instrument is nominal. However, since it is a paper form, printing costs should be considered.

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Innovative Agricultural Mechanics Professional Development through Summer Technical Institutes

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Introduction

According to Phipps and Osborne (1988), a total secondary agricultural education program consists of three essential and interdependent components. Specifically, these components are: classroom and laboratory instruction; independent experiential learning, commonly known as Supervised Agricultural Experience (SAE); and participation in the student leadership organization, typically the National FFA Organization.

In the field of agricultural mechanics, laboratories are essential educational tools for student development. Johnson and Schumacher (1989) stated that much of the instruction of the agricultural mechanics curriculum takes place in a laboratory setting. As such, a great deal of instructional time is spent in the agricultural mechanics laboratory. Phipps and Osborne (1988) estimated that in many courses, the time allocated for instruction in agricultural mechanics comprises 25% to 40% of the total instructional time. Shinn (1987) reported that the amount of time devoted to laboratory instruction may comprise one-third to two-thirds of the total instructional time in many agricultural programs. Furthermore, no one will dispute the fact that the use of a laboratory setting, where students can learn by doing, is a basic tenant of agricultural education programs (Sutphin, 1984).

In the curriculum area of agricultural mechanics, the basic objective for teachers is to foster the development of students' abilities to perform the mechanical tasks needed in agriculture (Phipps & Osborne, 1988). Johnson, Schumacher, and Stewart (1990) stated that students learn important psychomotor skills in agricultural mechanics education and that much of the instruction takes place in the school's agricultural mechanics laboratory. In order for teachers to effectively instruct agricultural mechanics curriculum to students, it is essential for them to be able to safely demonstrate these agricultural mechanics skills. Birkenholz and Harbstreit (1987) found that agricultural mechanics skills, i.e., electricity skills, were the third highest rated professional development need of [state] agricultural educators. Furthermore, in a 2008 study of [state] agricultural educators, agricultural mechanics was one of the curriculum areas that teachers reported as having professional development education needs in ([Author], Terry, & Schumacher, 2009). With the continuing emergence of agricultural mechanics as a topic for professional development education by [state] teachers, agricultural education institutions and the professional development staff of the [state] [Department of Education] should provide agricultural mechanics educators with professional development

education opportunities to learn agricultural mechanics skills and curriculum development techniques ([Author], Schumacher, Terry, Funkenbusch, & Johnson, 2008; [Authors], 2009).

Methodology

As a result of a statewide agricultural education professional development study ([Authors], 2009), the Agricultural Mechanics Summer Technical Institute was designed and implemented by the staff of the [Some University] to provide [state] agricultural teachers professional development education in the area of agricultural mechanics. During this summer technical institute, approximately 10 teachers received professional development education. The objectives of the summer technical institute included: arc welding, oxygen/ acetylene welding and cutting, plumbing, electricity, surveying, carpentry, small gas engine technology, project design and construction, and laboratory safety and management.. Additionally, participants learned curriculum selection, development, and implementation skills. This activity and others provided the participants with the opportunity to learn, demonstrate, and ultimately develop agricultural mechanics curriculum to further educate secondary, agricultural education students. At the conclusion of this summer technical institute, teachers received agricultural mechanics curriculum, a small gas engine, examples of metalworking projects, examples of plumbing projects, an electrical wiring board, and a carpentry project.

Results to Date

At the conclusion of the agricultural mechanics summer technical institute, participants were asked about the benefits they received from the course. Specific comments from the participants included:

- "Teaching niches, curriculum material, ideas from the instructor and other teachers were beneficial to me."

- The session activities that were beneficial to me were: welding, plumbing, woodworking, surveying, and project planning. Overall, this was a very great week and I had a great experience."

Future Plans

The Summer Technical Institutes will continue to be an integral part of the professional development plan for [state] agricultural education. The timing of these summer technical institutes will be designed to meet the specific needs of [state] agricultural educators: after the conclusion of the school year, before summer FFA camp, and prior to the beginning of the fall school semester. The content for future summer technical institutes will be prioritized based on empirical professional development research concerning [state] agricultural educators and the availability of facilities and content experts.

Costs/ Resources Needed

The costs for the summer technical institutes vary depending upon the content and materials provided. For the agricultural mechanics summer technical institute, the administration costs and supplies were $250 per person. To adequately instruct this institute, the instructors required a laboratory with work tables, a variety of hand and power tools, metal fabrication tools, safety glasses, and a computer with projector. Handouts and consumable supplies such as electrical wire, wood, etc. were also needed.

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An Evaluation of Hurricane Ike Recovery: A Collaboration Opportunity for Extension Evaluation

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Introduction/need for innovation or idea

On September 13, 2008, a Category 2 hurricane known as Hurricane Ike, made landfall over Galveston, Texas. Hurricane Ike was one of the largest Hurricanes to hit the United States in recent years and has become one of the costliest hurricanes in the Nation's history (FEMA, 2008). Communities impacted by Hurricane Ike suffered immediate and long-term strains on families' financial stability and health and human services, such as child care, public education, and senior support systems. The Federal Emergency Management Agency's (FEMA) preliminary estimates have indicated that housing damages in the cities and counties impacted by Hurricane Ike will exceed $3.4 billion.

To aid individuals and families in their recovery processes, FEMA awarded a $58.2 million grant to a [State Government] Agency (Agency) to fund the Long-Term Disaster Recovery Case Management Pilot Program (DCM). The DCM was designed to provide disaster case management services to some 40,000 Texans impacted by Hurricane Ike. In order to

provide case management services, the Agency contracted with three nonprofit organizations to deliver case management services to affected individuals and families living in 34 counties. Multiple government and non-government agencies will be necessary to facilitate the successful recovery efforts and return residents of affected areas to pre-hurricane status.

The Agency also contracted with [State] Extension to conduct a process evaluation to provide the Agency and FEMA with information that will allow them to develop a model for a federal disaster case management program for future disasters. Extension's role in partnerships is well noted in the literature (Carpenter, 1993; Patton, 1986; Ratchford, 1984) especially with providing expertise in evaluation. Because of its university foundation and roots in the local community, Extension is well suited to present an unbiased, well informed evaluation using the resources available in the Land Grant system.

How it works/methodology/program phases/steps

A process evaluation approach is being utilized to collect empirical data to assess the delivery of DCM programs. The [State] Extension process evaluation is documenting and analyzing the early development and actual implementation of the strategy and program to assess whether strategies were implemented as planned and whether expected output was actually produced.

The [State] Extension's process-based evaluation consists of a systematic three-tiered data collection approach, with an external Research Advisory Committee (RAC). The [State] Extension Evaluation Team closely collaborates with the evaluation teams of each nonprofit agency to ensure data consistency, adjust programmatic endeavors as practicable, fine-tune evaluation procedures and reporting processes, and provide overall evaluation results. The three-tiered data collection approach of the evaluation provides substantive evidence of DCM's usefulness and success in restoring clients to pre-Hurricane Ike status. The three tiers consist of:

1. Quantitative and Qualitative analysis using data mining of the nonprofit agencies program data collected and entered in the DCM Pilot Project central data collection site.

2. Focus groups and interviews of elected and county officials, case worker staff, county health department and social services unit, staff of associated organizations, etc. to determine agency and local government perceptions of the usefulness, practicality, and success of the DCM pilot test.

3. Interviews of a stratified random sample of DCM clients to determine client perceptions of the usefulness, practicality, and success of the DCM pilot test, and validation of clients' initial Tier assignment and movement to new Tier during the course of the DCM project.

Results to date/implications

To date, both tier-one and tier-two of the evaluation strategy are operational. Data collected via central data collection site has provided comprehensive information on case management services for those needing assistance. However, extracting data from these systems has proven to be challenging; largely because the data collection site was designed to serve as a

means to track disaster survivors' progress toward recovery rather than provide useable data to an external evaluation component.

Tier-two data collection has focused on face-to-face interviews with county personnel and case managers. More than 175 interviews have been conducted. Preliminary data indicates a strong need for case management services, including housing, food/nutrition, and employment needs. Challenges facing case managers include a lack of resources to help clients meet their needs and the time it takes for services to be made available. The project is currently fully operational. Future plans include completing Tier-one and -two of the evaluation. Tier-three will begin once clients begin to steadily complete the recovery process.

Costs/resources needed

A four-person management team conducts oversight of the overall Extension evaluation of the DCM Pilot Project. A five-person field evaluation team conducts field interviews and produces reports for submission to the Agency. The Management Team collaborates closely through regular meetings with the RAC to determine effectiveness of data collection and appropriateness of evaluation direction.

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BLOGGING IN THE CLASSROOM: THREE PEDAGOGICAL APPROACHES TO USING BLOGS FOR REFLECTION

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Innovative Idea Poster Submission

Introduction

Reflection has been a long standing tradition in agricultural education, especially as it relates to the use of experiential learning in classrooms (Roberts, 2006). There are many theoretical orientations to experiential learning and each identifies the practice of reflection as an essential learning component in the educational process (Townsend, 2002). Traditional reflection methods have included journaling (paper and electronic document), shared discussion, role play/taking, making metaphors, fish bowling, etc. However, as the student demographic changes and millennials become the prevailing student majority identifying teaching methods which align with their comfort and preferences will be increasingly important. Blogging as means to engage student reflection is an appropriate and relevant tool to add to the teaching "toolbox." Yet, before an instructor can capitalize on this method it is important to establish a basis for what blogging is and the many forms it can take as a classroom pedagogical tool.

Methodology

Blogs are part of a cadre of online tools that have grown in popularity in recent years (Richardson, 2006). Blogs, originally known as Web Logs, are instantly updateable websites that allow the author or authors to publish personal thoughts and comments in the same manner as a personal journal or diary (Blood, 2002). Scholars have commented on the integration of blogs into teaching and learning, developed specific strategies for utilizing blogs in the classroom and

have suggested using blogs for the dissemination of information from teacher to learner and from learner to teacher (Gifford, 2009; Gupta & Meglich, 2008; Pittinsky, 2003; Richardson, 2006).

This poster will present three methods for using blogs in the classroom. These methods include instructor blog (teacher to learner), student blog (learner to teacher) and a combination of instructor and student blogs (teacher to learner/learner to teacher). Each of the three methods presents a unique strategy for instructors and learners to analyze and synthesize course concepts and discussions.

Results to date/implications

In an undergraduate leadership course, students participated in a 20-hour service-learning project outside of and in addition to the classroom requirement. Students were assigned to write a series of leadership blogs to reflect upon their service-learning project and integrate concepts learned in the classroom with the experiences at the project site. Students were specifically assigned to use a "what – so what – now what" model in their writing. Students using the what—so what—now what model for a blogging reflection exercise averaged higher grades and more consistently met the objectives of the assignment.

In an undergraduate agricultural communications course the instructor utilized a course blog as a tool to reach students outside of the classroom. The blog provided a means to encourage critical thinking about class topics or objectives, as well as additional academic content that could not be covered in class. Using blogs in this manner allows for more time outside the actual classroom that instructors can stimulate thought and provide extra incentive for searching out and using additional resources.

In a graduate leadership course both instructor and students blogged about personal leadership experiences. This allowed for students to have a model of blogging provided by the instructor, but also provided students with insight into the instructor's thoughts about leadership and her faculty role. Students shared their personal stories and thoughts over the course of the semester and were encouraged to read one another's blogs and post comments which were supportive and reflective. Additionally, a course blog was developed to host thoughts and perspectives related to the course, as well as provide a platform for links to student blogs. It has been found to be an innovative way to have students reflect on their experiences and familiarize them with social media.

Future plans/advice to others

Educators' use of internet tools will enhance teaching and learning with a generation of students who are increasingly using the internet as a primary source of information (Gupta & Meglich, 2008). Educators may find adaptation of pedagogy to meet this shift toward the internet to be a particularly useful and effective method for meeting the learning styles of today's students (Pittinsky, 2003).

Educators may consider integrating blogging technology into the learning experience for students by replacing hand-written or hard copy journals with online blogs. Educators may also

find blogging useful as a means for disseminating, reviewing and supplementing course material. Anecdotal and quantitative evidence support the effectiveness of use of blogs in the classroom. Educators should consider which of the three methods described would be most effective and appropriate for their classroom.

Costs/resources needed

No costs are associated with most blogging activities. Many blog hosting websites are free of charge and provide free hosting services for blogs (i.e.—Wordpess, Blogspot, Blogger, Typepad).

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Bookworm Basics: Training Teen Volunteers at Athens Drive Community Library

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Bookworm Basics: Training Teen Volunteers at Athens Drive Community Library
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Introduction

In 1989, The Search Institute began a study of youth from all across the United States and Canada. Over the next eighteen years, this study surveyed over two million individuals, and resulted in a list of 40 Developmental Assets® (Why are Developmental Assets Important?, 2007). These assets are "concrete, common sense, positive experiences and qualities essential to raising successful young people" (What are Developmental Assets?, 2007, p. 1). A few of these assets include access to a caring school climate, school engagement, youth as resources, and service to others (40 Developmental Assets for Adolescents, 2007). Today, community service

learning and volunteer initiatives are "hot topics" for discussion across the nation and across academic disciplines.

Despite the current state of the economy, volunteerism has remained constant nationwide. Across the country, 26.4% of the population volunteered in 2008, resulting in 8 billion hours of service (Volunteering in America, 2008). Of these hours, 55 million were attributed to service performed by teenagers, ages 16 to 19. Teens volunteer in a variety of ways and for many different reasons. The most popular area for teen community service is within an educational setting (Volunteering in America, 2008). An example of one such program is found at Athens Drive Community Library in Raleigh, North Carolina.

Located within the Wake County School System, Athens Drive Community Library maintains a strong relationship with the community they serve, by providing opportunities for a wide variety of individuals from the surrounding community to volunteer within the library. The most common of these volunteers are teens. Library volunteers are trained and managed by a library employee who is designated as the volunteer coordinator.

Currently, there is no formal, standard volunteer orientation or training for the library. The volunteer coordinator works individually with each volunteer, each time they work, which takes considerable time away from other programmatic responsibilities and opportunities. Lulewicz (1995) says that effective training programs:

- Are developed when specific job and task requirements are clearly identified
- Organizational and volunteer needs are recognized and brought into the development of the training program
- Identify what job knowledge needs to be acquired, what skills developed, what values transmitted, and what motivations can be built upon

Training and development of volunteers is the cornerstone of organizational stability. By implementing a formal orientation and training program for student volunteers, the effectiveness of this program will improve.

How it Works

According to Enfield, nonformal education uses experiential learning activities to foster the development of knowledge and skill (Enfield, 2001). Russell states that hands-on or experiential learning has been a key characteristic of 4-H programs for a long time (Russell, 2001). Teen volunteers typically perform service immediately after the end of the school day and can become tired of the formal educational setting. Knowing that, using a hands-on approach for a teen volunteer orientation program will more deeply imbed the knowledge gained. The template used at Athens Community Library in the "Bookworm Basics Program" could be successfully applied in other arenas as well.

The Bookworm Basics Program is an orientation and training program for teen volunteers at the Athens Drive Community Library in Raleigh, NC. The mission of Bookworm Basics is to utilize interactive strategies to effectively orient and train youth volunteers.

Orientation Workshop- Morrison (1994, p. 75) tells us that "early orientation can influence later enthusiasm". Each new volunteer begins their experience with a welcome and overview of the

library. Included in this workshop are introduction of library employees, expectations of teen volunteers, and how volunteers contribute to the library. Policies specific to volunteers are also outlined. A brief library tour and opportunities for questions and clarifications conclude the session. Upon completion of the one-hour orientation, students are invited to enroll with the library volunteer program.

Training Sessions- After the orientation session, students who choose to volunteer with the library are required to take part in an organized training session, prior to their first day of service. These sessions are held every other Friday afternoon, so that students and the volunteer coordinator can plan accordingly. Nadler (1984) categorized developing human resources in three ways: training, education, and development. In the case of the library's program, we focus on training, or learning that is related to one's present job (Nadler, 1984, p.1.16). Each library volunteer, whether teen or adult, have similar tasks to complete each time they volunteer. The training focuses on a demonstration of those tasks included a demonstration of proper procedures for organizing and shelving books, how to "pull" resources that have been requested by other libraries, and research techniques. Volunteers also receive a description of available resources including the large, detailed, visual maps of the various sections of the library. At the end of the training, students have the opportunity to demonstrate their understanding of the training and utilize their newly acquired skills by participating in an interactive scavenger hunt. Lutz, et.al, tells us that interactive teaching methods have an affect on learning and demonstrated a higher engagement learning and a deeper reflective of understanding (Lutz, et.al. 2006). By utilizing a hands-on experience, teens will be engaging in an activity that uses the new knowledge gained. This activity takes them around to each section of the library, and has them performing tasks similar to those they will be doing each time they volunteer.

Volunteer Handbook- A binder containing all materials relative to the teen volunteer program is provided as a reference tool for all volunteers. The handbook includes an introduction to the library and its volunteer program, outline of the workshop plan, copies of all training materials, and miscellaneous documents the volunteers will find helpful including a calendar, time sheets, and volunteer information forms. The binder also has handouts reminding volunteers of expectations, policies, and procedures

Future of Plans

Future plans include conducting a program evaluation at the six month and one year interval from implementation date. Based on the predicted success of the program, similar projects could be introduced at other libraries with teen volunteer programs.

Costs and Resources Needed

Resources necessary for implementing this program are minimal. There is no cost to the participants of this training program. The orientation and training facilitators are the most significant resources. Their time and dedication is invaluable to the success of the program. Minimal costs associated with the implementation of this program include materials for constructing visual maps as well as the production of a volunteer handbook and distribution materials.

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Bringing Experience Into the Classroom Through the Use of Blogs

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Introduction/Need for Innovation or Idea

Dewey (1938) emphasized the need for experience as a basis for true learning. Preservice agricultural education programs promote the acquisition of experience through a variety of ways, including field trips, observations, and field experiences. With an increase in the popularity of blogging in today's society and among educators, the inclusion of blogs provides an additional method of connecting course content to real world experience. As noted by Solomon and Schrum (2007), "With this new means of publishing, educators are free to share their ideas about issues and offer examples of what works" (p. 56).

How It Works

Through the use of technology resources such as Twitter, Google Reader and educational websites, finding a variety of educational blogs is effortless. For example, the Scholastic (2009) website maintains a list of "Top 20 Teacher Blogs". Bloggers may also suggest additional blogs for reading. Larry Ferlazzo is a teacher and blogger who has created lists of recommended blogs such as "The Best ESL/EFL Blogs" (2009c) and "The Best Places to Find Good Education Blogs"(2009a). By identifying and consistently reading relevant blogs, course instructors can bookmark blog posts that supplement course topics and utilize posts as references or as part of a course assignment. Instructors may also consider having students read specific blogs throughout the semester.

Results to Date/Implications

Blogs have been used to supplement content and assignments in two courses. In Computer Applications in Agricultural Education, content topics include using Twitter as a Teaching Tool, Wordle, and Google. Students are directed to read applicable blog posts and then have the opportunity to discuss the additional information and ideas acquired from the blogs in class and through discussion board posts. In Teaching Methods for Agricultural Education,

students are required to read the blogs of new teachers as an example of teacher reflection and refer to blogs for classroom management ideas. Table 1 provides more specific information on a few of the blogs currently integrated into the courses.

Table 1

Blogs Used to Supplement Classroom Instruction

Course Topic	Blog	Title of Blog Post
Twitter	Teach Paperless (2009)	Best Practices in a Twitter Enhanced High School Classroom
Wordle	The Clever Sheep (Lucier, 2008)	Top 20 Uses for Wordle
Google	A Math Teacher Living in the 21st Century (2009)	True Life: Google Saved My Life
Teacher Reflection	Miss Calcula8 (Miller, 2009)	Week 10
Classroom Management	Larry Ferlazzo (2009b)	What Do You Do When You Have a Few Minutes Left in Class?

Future Plans/ Advice to Others

The inclusion of blogs into the classroom has been an excellent method of providing preservice teachers with the opportunity to gain additional insight and ideas from other teachers and will be continued in the future. Currently, it is a challenge to find blogs that are maintained by agriculture teachers. To help promote the creation of blogs specific to agricultural education, blogging will be promoted as a reflection tool throughout teacher education coursework and student teaching. Also, blogs can be used in induction programs to help novice teachers establish a professional network of other novice and experienced teachers who can provide comments and suggestions.

In an effort to make blog reading a more time efficient process, faculty members should utilize Google Reader and bookmarking sites such as Delicious to help organize blogs and keep current with new blog posts. With the opportunity for students to interact with educators from around the world, faculty members should provide instruction on professional conduct in an online environment. Students may need assistance in learning how to communicate most effectively using language and online etiquette appropriate for the profession. Students may also need to be reminded that blogs are a forum for all opinions and they may not necessarily agree with all that is written in a blog.

Costs/Resources Needed

The only resources needed to begin incorporating blogs into the classroom are a computer, Internet access, and time to search and review blogs.

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Collaborating to Reach Untapped Populations with Recruitment Efforts

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Introduction

Statistics show that the majority of students in the United States attend colleges less than 100 miles from home (Mattern & Wyatt, 2009). Universities outside this radius often do not have a strong enough presence to draw student interest. With a desire to continue drawing the best and brightest and serve the needs of the entire state, the cooperative extension service teamed up with [a large university satellite campus] to provide a recruitment event tailored toward youth in the southern part of [the state]. The intention of this recruitment event was to increase visibility of both the main campus and the satellite campus and draw student interest in majors and career opportunities in agriculture.

How it Works

Collaboration of several different sources was necessary to bring youth from South [State] together with [University] faculty, admissions personnel, and financial aid specialists. At the center of the network is the southwest district 4-H program coordinator, [name]. She was responsible for alerting all 4-H leaders in the southwest district of [State] about the event. Communications were also sent out to the network of agricultural science teachers by local agriculture education faculty. Science teachers and participants in [a local youth research program] were contacted by the program manager of the K-12 Outreach program. Information was also made available to local two-year institutions to reach potential transfer students.

Participants RSVP'd and preparations were made for welcome packets and a catered meal for all attendees. Student Ambassadors from both the main campus and satellite campus were present to help with directing participants and answering questions about campus life. A general session was held while participants enjoyed their meal. Attendees were welcomed and general information on admissions and financial aid was covered. Afterward, individual sessions were held in separate rooms for potential students, parents, and transfer students, to help address the concerns of each group. Afterward, participants gathered for door prizes.

Results to date/implications

The 2009 Southwest District Recruitment event was attended by over 200 potential students, parents, and transfer students (Haire, 2009). Every department in the College of Agriculture and Environmental Sciences (CAES) was represented by at least one faculty member in addition to a representative for international programs. Attendees enjoyed a catered meal

while listening to speakers discuss admissions procedures and financial aid considerations. Booths were set up for each department and faculty members were available to hand out informational materials and discuss career options.

Since the start of this annual event, over 700 people have attended and interacted with CAES faculty. Applications to the [University] from students in southwest [State] have increased by 30% as of the 2009 event (Haire, 2009). These results imply that by exposing youth to the education options in the College of Agriculture at the [University] in a local setting, interest is developed and youth see attending the university as a more attainable goal. In addition, having an event in a local venue allows parents to attend and develop a level of comfort with the idea of their child pursuing an agriculture degree at the [University]. Often, parents and students are unaware of the satellite campus and the majors offered locally. This event brings light to the opportunities available for students to obtain a four-year degree from the [University] while remaining close to home.

Future plans

This event just completed its fourth year and plans are in place for next year's event. The results have been positive with attendance increasing each year. Applications to the [University] from the southwest area of the state have increased significantly which is the desired result of this event. Buy in from all collaborators is a must. Each person involved interacts with a specific set of potential students and the event would not be able to reach such a variety of potential students without the effort of everyone. By collaborating and bringing each of these groups of potential students together in one big recruitment event, more people are reached and the excitement is much greater than could be developed with separate recruitment efforts.

Resources Needed

This event is sponsored by the College of Agriculture and Environmental Sciences. Space for the event is provided on campus free of charge through the office of the Assistant Dean for Academic Affairs on the [Satellite] Campus. The major expense associated with this event is the catered meal. Money to cover meal costs was provided from the office of the Associate Dean for Academic Affairs. Faculty and the admissions and financial aid specialists donated their time. Travel, when necessary, was covered by the respective departments of individuals in attendance. Each person involved in advertising the event provided postage, as required, from their respective budgets and electronic media was liberally used. Printed information included in welcome packets was developed and printed by the Coordinator of Academic Programs, and door prizes were donated by local organizations and businesses

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College of Agricultural and Life Sciences Leadership Institute (CALSLI)

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Innovative Ideas Poster

College of Agricultural and Life Sciences Leadership Institute (CALSLI)

Introduction

The overall objective of the **College of Agricultural and Life Sciences Leadership Institute (CALSLI)** was to create a sustainable leadership development program for undergraduate students enrolled in the College of Agricultural and Life Sciences through integrated curricula, mentorship, a practicum experience, personal development modules, and an international leadership education experience.

Steps

A cohort of 9 students was selected to participate in the 17-month program. Minimum qualifications for students include the completion of 40 credit hours, a 2.5 cumulative grade point average. Selected students started at the beginning of the fall academic term in August 2009 and will conclude at the end of the fall academic term in December 2010. Assessments of student leadership behaviors, leadership knowledge, problem-solving style, critical thinking disposition, personality type, personal strengths, and demographic characteristics will be conducted at the beginning of the program.

Specific objectives include:

- To enhance student personal development specific to the needs of each student and it's through the creation of individualized Personal Development Plans (PDP) as they relate to agricultural business in a global society.
- To create and deliver a set of 14 leadership education/agricultural business modules delivered in monthly meetings to the cohort group.
- To design and deliver a formal colloquium course focusing on leadership modules developed from the leadership literature with an emphasis on the globalization of agricultural business markets and trade. The course will be taught by a faculty member within the college.
- To develop and implement a mentoring program for student participants utilizing leaders from the agricultural industry and the Gainesville community.
- To strengthen community partnerships and contextual learning experiences for our students through the mentorship program and the practicum.

- To plan and conduct an international study abroad program for student participants to gain a broadened perspective of leadership and agribusiness in a global market.
- To create and utilize a leadership certification participant handbook for student participants and faculty or business/community leader mentors.
- To assess student personal characteristics, leadership knowledge, leadership practice, and leader behavior to develop a model to explain student leader behavior change.

The second cohort will begin in the fall academic term in August 2010 under the leadership and education of the first cohort group.

College of Agricultural and Life Sciences Leadership Institute (CALSLI)

Results and Implications to Date

Phase I results include:

- Selection of leadership topics/agricultural business and creation of modules that would be used with the first cohort group.
- Creation of program supplementary materials for mentors, students, and faculty.
- Creation of selection process and guidelines for the first group of cohort members, and conducting the actual selection of those group members.
- Development of colloquium course syllabus, instructional materials, and academic standards for the course.
- Creation of possible practicum sites and experiences for the first cohort group.
- Identification of faculty and industry leaders to serve as mentors.

Goals for the future as related to Phase I include

- Development of international experience and coordination with the host institution for the first cohort visit.
- Secure and create assessment tools and leadership assessment evaluations for the first cohort group.
- Development of evaluation plan for the effectiveness of the first cohort activities.

Overall students have been very enthusiastic about the modules, guest speakers, their mentors and the opportunity to grow as leaders. Mentors have been extremely cooperative, eager and

Future Plans

In the future CALS LI plans to begin an intense recruitment campaign for the second cohort, develop worksheets and additional learning activities to accompany the current curriculum and modules, coordinate with other leadership development programs, and maintain current staffing support and mentors while getting others to participate and offer their professional advice and support. Future initiatives are also to expand leadership services and programs for CALS and expose students to a variety of business markets and trades.

Cost and Resources

More than 50 percent of the personnel costs for the project are being contributed by the college. Expenses for the student programs and activities are modest. A partnership with a Central American University will allow cohort members to expand their cultural knowledge and tolerance through the education of leaders with common interests and goals at a foreign institution, and a service learning project. The Central American venue is cost effective and will give students a valuable international experience. Speakers and tours related to agriculture, agribusiness, and related sciences will provide new experiences and enriched understandings of life and business, marketing and trade in a different country.

Collegiate Leadership: Developing a Global Perspective on Agriculture Education

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Introduction/need for innovation or idea

Students serving as Ambassadors in an agricultural college at a southern land grant university are given the opportunity to participate in a study abroad trip every other year. This past summer fifteen students, accompanied by the Dean and the Director of Development and Recruitment, flew to Egypt for twelve days. These students were exposed to a culture different than their own and given the opportunity to spend time in an Egyptian agricultural classroom. The purpose of the trip was to offer students a broader and more global perspective on agricultural education and to develop as young leaders.

William Hare (1979) defined open-mindedness as "a person who is disposed to make up his mind in the light of available evidence and argument as objectively and as impartially as possible" (p. 9). We believe to be a well developed leader, students must strive to be open-minded by expose themselves to a different cultures, religions and ways of life. This expedition encourages students to self-reflect, broaden their perspective and have a stronger appreciation for the American classroom.

The study abroad program also challenges students to think critically. Facione (1990) defined critical thinking as "purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations" (p. 2). Through group preparation,

self reflection, journaling and interactions with Egyptian students and agriculturalists throughout the trip, students are encouraged to think critically about education and how it relates to agriculture in and outside the classroom. Students who have the ability to think critically and be open-minded are more likely to be effective leaders.

How it works/methodology/program phases/steps

The objectives of the trip are for students to be exposed to cultural differences, educated in agriculture education and production in Egypt, and have a strong appreciation for their own homeland education system, resources and agriculture. Although many higher education students participate in study abroad programs, this program is very different than others. The students receive extensive preparation prior to the trip. The course met once a week and included guest speakers. Students who had traveled to Egypt while they served as Ambassadors and an Egyptian professor currently teaching at the agricultural college shared their knowledge and experiences about Egypt. Students are required to journal during the duration of the trip, and then asked to reflect upon their experience when they return home.

The semester prior to the trip students are enrolled in a single credit course that educate on the Egyptian culture. They hear from guest speakers who have traveled to Egypt, read literature related to Egyptian history, customs and beliefs and participate in group discussions to address any stress or concerns related to traveling. During the duration of the trip, students are required to journal on a regular basis. Some students chose to journal daily, some journal food and others recorded where they had been and what they had seen. There were no guidelines for the journal assignment. Students are simply asked to reflect on what they were experiencing. This allows students to develop cultural awareness and appreciation. Once the students have returned home they are asked to turn in a copy of their journal and submit a reflection of what they learned, how it impacted them and what they have done differently since returning home. The Dean initiated the annual program for the Ambassadors, and has worked with MUCIA, Midwest Universities Consortium for International Activities, Inc. for many years. MUCIA's mission is to conduct educational projects to improve education worldwide. The trip is a part of completing MUCIA's project at Cairo University in Cairo, Egypt. Students were able to see presentations given by Egyptian students studying various disciplines in agriculture. They were able to interact with many of the students there and many are still keeping in touch via Facebook online.

While in Egypt, students travel through Cairo, Luxor, Memphis and Hurghada. They explored Egyptian history by visiting the Egyptian Museum and many historical temples and maesks. Students also visited a nearby vocational agriculture college that faces obstacles such as lack of funding, language barriers, poverty and gender inequality, like so many in Egypt today do. A portion of the trip focused on agriculture education and production. The Ambassadors toured family and large production farms and learned about the different commodities the Egyptians produce.

Results to date/implications

This approach to leadership development challenges students to think critically and strive to be more open-minded. It also leads many students to become interested in international relations

and agriculture education as future careers. Through journaling it allows students to reflect upon their experiences and observations and also develop interpersonal leadership skills. Examples of student journals will be shared on the poster.

Future plans/advice to others

Leadership courses, as well as organizations developing young leaders, should strive to incorporate a study abroad program that allows students to view agriculture education and production on an international level.

Costs/resources needed

Students who traveled to Egypt paid $2,500.00 prior to leaving the country. This amount paid for their hotel accommodations, museum tickets and a number of meals. They also took personal spending funds for souvenirs and some meals. Students were encouraged to seek travel grants and scholarships. Sponsors and fundraising may also assist to raise funds. To implement a similar study abroad program into a leadership course the cost per student could range from $500.00 to $3,000.00. Many of the factors that would impact the amount is the length of the program, which country they were traveling to, and if any sponsorship was obtained for the expedition.

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Cooperative Extension Strategic Planning: Researching the Big Picture

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Introduction

In 2009, the state's cooperative extension system began a planning process to develop a five-year strategic plan. As the state steering committee for the cooperative extension system began their discussion of how the planning process should take place they looked to the literature to determine recommendations for conducting a strategic planning session.The steering committee wasThe steering committee disappointed to find that little had been published offering recommendations in the extension literature. The Journal of Extension has published only a handful of studies relevant to strategic planning or organizational change initiatives (Bull, Cote, Warner, & McKinnie, 2004; Johnsrud & Rauschkolb, 1989; King & Boehlje, 2000; Schmitt & Bartholomay, 2009). Unfortunately none of the studies reported how state cooperative extension systems initiated and completed the strategic planning process. As a result, the VCE interim directordirector invited Agricultural Education and Extension Department faculty to conduct a study of the strategic planning process in an effort to provide insight and guidance to other extension organizations engaged in similar endeavors. The Agricultural Education and Extension Department research team has been observing the planning process since May 2009 and will continue to observe and record the process until February 2010 when the steering committee will complete its five-years strategic plan for the state's cooperative extension system.

The theory of Cervero and Wilson was utilized by the research team as a conceptual framework to better understand the dynamics of group planning. According to the Cervero and

Wilson (2006), planning is a "social activity whereby people construct educational programs by negotiating personal, organizational, and social interest in contexts marked by socially structured relations of power" (p. 24). The authors posit that it is "practically and ethically essential to ask who benefits and in what ways" (p. 26) from the programs. Based on this theory, planners need to have an understanding of who participates in the planning process.

To gain a better insight into the process, the research team observed a variety of groups that were participating in the process. These groups included the steering committee, subgroups created from the steering committee, internal cooperative extension audiences such as staff, faculty, and specialists, and external audiences such as agricultural commodity groups, and state and local government officials.

Methodology

The research study was designed as a qualitative case study to answer the following questions:

1. How are the planning practices initiated and implemented in a state-wide strategic planning initiative?
2. How does the steering committee influence the planning process?
3. How are the expected and unexpected barriers in the planning work addressed at the state, district and county levels of the planning process?

Data was collected from: 1) observations of steering committee meetings, 2) formal in-depth interviews with the state extension director, the three state program directors, participants in the steering committee, as well as participants in the district and county planning meetings, and 3) qualitative document analysis (Yin, 2003). The participants in this study include the state extension director, the three state program leaders, the 26 individuals identified as the state steering committee, as well as all participants in the district, county and center-based and campus-based extension faculty.

Prior to observing the first planning meeting of the state steering committee and then throughout the duration of the case study, the research team collected documents and archived records related to the activities of the strategic planning work. Materials were collected from the cooperative extension system website, archived staff records from earlier planning meetings for previous conferences, as well as the cooperative extension system annual reports.

Formal observations (Yin, 2003) are being conducted during each of the planning meetings and by the inclusion of the researchers in all email exchanges that have taken place in between the formal group meetings. Throughout the study the researchers have maintained a role of participant observer (Spradley, 1980), allowing the planning group members to know that they are being observed. The researchers recorded field notes during all observations and composed research memos (Spradley, 1980) to capture their reflections and reactions to the events they experienced. These observations were planned, focused (Spradley, 1980) and guided by observation protocols (Yin, 2003).

Another data source in this descriptive case study will be a series of interviews with select participants of the steering committee, district meetings, and county meetings. The

interviews will be designed to bring to the surface deep, authentic experiences, and to provide respondents the space to offer their opinions and reflective insights (Gubrium & Holstein, 2001) into the strategic planning work.

Implications

Throughout the study preliminary results have been provided to the steering committee in order for the members to have more information. This additional information about the process as it being conducted allows the steering committee to adjust the procedures as they are occurring in order to have the process run as smoothly as possible.
The preliminary final results from the study have been provided to theExtension steering committee on an ongoing basis in order to give the committee members information about how the planning process is progressing. The final results will be published in extension and agricultural education journals to offer guidance and recommendations to individuals involved in strategic planning processes in other cooperative extension systems across the nation.
(take out Virginia)

Future Plans

the future the research team will observe and analyze how the resulting strategic plan that is developed by the steering committee is implemented. Research will be conducted into how the extension faculty, staff, and specialists resist or embrace the plan. Another component of the research will be how the external audiences in the state such as agricultural commodity groups, homeowners, and state and local officials react to the strategic plan.

Resources Needed

The research project required fifteen thousand dollars to complete which covered travel costs for the research team to observe meetings. Expenses were also incurred for conducting, transcribing, and analyzing interviews.

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Creating Partnerships between United States Agriscience Teacher Ambassadors and Egyptian Agricultural Technical School Teachers

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Introduction

Nearly 8,000 high school instructors in 50 agricultural technical schools in Upper Egypt provide instruction in agriculture for more than 100,000 students. Much of that instruction lacks a strong infusion of science in agricultural concepts (Abdellah, Taher, & Ismail, 2007). United States high school agriscience teachers can assist their international counterparts in improving curricula and teaching methods. Additionally, the US teachers can gain significant experience that can be shared with fellow teachers, their students, and others in the United States. More than 10,000 teachers provide instruction in agriculture to 700,000 students in the United States (National FFA Organization, 2006), and better prepared teachers in the area of international agriculture will enhance the education of those students (Miller, & Madou-Bangurah, 1993).

In the United States, agriculture teachers have the opportunity to participate in the National Agriscience Teacher Ambassador Academy (NATAA). The NATAA is an intensive week-long professional development opportunity that immerses participants in inquiry-based teaching techniques. These sessions are led by nationally recognized experts in inquiry-based teaching techniques and teacher professional development design and delivery. In addition to attending the weeklong event, NATAA participants must also demonstrate that they have integrated the concepts and techniques taught at the Academy into their own classrooms and have instructed other teachers on how to implement the techniques.

To increase the level of teacher understanding and usage of inquiry-based instruction in Egyptian Agricultural Technical School (ATS) classrooms, two selected National Agriscience Teacher Ambassadors visit ATS classrooms and agricultural industries in Upper Egypt and gather information on current practices in both. This information is utilized to develop workshops on inquiry-based instruction, which are delivered to Egyptian ATS instructors by additional visiting National Agriscience Teacher Ambassadors. This visit is critical to ensure that materials included in the professional development workshops (content and teaching techniques) are applicable to the ATS setting.

Steps

A southern state land grant institution, Midwest Universities Consortium for International Activities' (MUCIA) Cairo Office, and Egyptian Agricultural Technical Schools (ATS) have collaborated to design a visit for two National Agriscience Teacher Ambassadors to various ATS classrooms and agricultural industries on a twelve-day tour of Upper Egypt. The trip includes visits to four schools, during which ambassadors conduct on-site interviews with the school headmaster, teachers, and students, and collect information regarding the school's technology infrastructure. Additionally, the ambassadors visit four agricultural businesses, during which they conduct on-site discussions regarding agriculture and ATS/industry collaborations.

During the stay in Egypt, the ambassadors work with collaborating participants to plan and design workshop materials, which is delivered to Egyptian ATS teachers by National Agriscience Teacher Ambassadors, and to develop a tentative workshop agenda. This workshop is also created for web-based instruction so educational materials will be accessible worldwide.

Results and Implications to Date

Agriscience Teacher Ambassadors serve to ease collaboration efforts between American and Egyptian agricultural education, while bringing the value of such relations back to their classrooms. This in turn prepares future college students to develop these relationships further upon entering a secondary agricultural education program. Lastly, Egyptian ATS teachers benefit through ambassador-developed workshops that teach best practices in implementing inquiry-based instruction into agricultural lessons, thereby improving their teaching methods of science-based agricultural content.

Advice to Others

As more and more avenues of education and employment are focusing on international relations, postsecondary institutions of agricultural education are encouraged to work with both domestic and foreign entities to best prepare their students for working in some kind of relation with international agriculture. Agriculture teacher educators can collaborate with various organizations, as is displayed here, to develop a symbiotic relationship with foreign agricultural entities, benefiting secondary and higher agricultural education programs both domestically and abroad, and students enrolled in each.

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Cross Cultural Immersion in Cooperative Extension: An Analysis of a [State] Program

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Introduction/Need for Innovation or Idea

One of the largest populations to increase in the United States in recent years is that of the Hispanic population. Extension educators are now charged with the task of creating innovative programs, organizing educational seminars, and working with clubs or organizations to better meet the needs of this population. Ludwig states, "Global is becoming part of local, and education and support for clientele will have to be delivered within a culturally sensitive framework" (Ludwig, 2002, para. 13). This increase of global becoming local creates a need for training in cultural competence of Extension professionals when dealing with other populations.

How it Works/Methodology/Program Phases/Steps

In order for the Cooperative Extension to remain effective in its position to the nation, leadership of the system must provide an atmosphere that permits professionals to continually

develop their cultural competence. "Leadership must provide the environment that allows staff to learn new skills for designing programs and to employ people from historically excluded groups, while staff has to engage in the personal development work that will build a welcoming environment" (Schauber & Castania, 2001, para. 4). This responsibility of the Cooperative Extension in [State] has largely been explored through cultural exchange and immersion programs. These programs are used to engross professionals in a different culture while concurrently creating cultural competence. The University of [State] began its Cross Cultural Studies Program (CCSP) in 2002, with its objectives defined by Ames and Atiles (2008) as the following:

> (1) to provide participants with a knowledge of social, cultural, and environmental issues . . . [of Latin America]; (2) to compare and contrast cultural values between . . . [Latin America] and the U.S. and to interpret these values relative to the Hispanic and non-Hispanic communities in . . . [State]; (3) to learn about globalization and its impact on . . . [Latin America]; and (4) to expose participants to basic Spanish language skills. (para 4)

A typical cross-cultural experience through the University includes a trip to a local University in the host country, tours of numerous agricultural sites, social service agencies, public health clinics, and rural schools. The intention of visiting these various sites is to give participants a broad set of cultural experiences so that they can better understand, communicate with, and ultimately work more effectively with Hispanic communities in [State]. Upon their return participants are expected to expound upon their current programs and share their experiences with other Extension educators across the state to encourage excitement and interest in the program. It should be noted that immersion experiences are invaluable to these professionals and provide them with an opportunity and occurrence that they would not be able to achieve in the United States, "Submersion into another culture provides a perspective that, in some ways, is difficult to transfer" (Marsden, 2000, para. 4).

The emphasis of the research performed was placed on the analysis of benefits, knowledge gained, and change of attitudes and practices resulting from participation by outreach professionals in the [State] CCSP. In the spring of 2009 volunteers were selected from a list of alumni (past participants) of the Program. Response was completely voluntary and participants were asked to participate in an interview that lasted 45 minutes. Interviews took place either in person or via the phone.

Results to Date/Implications

Seven cross cultural immersion participants completed the interview and were asked seven questions regarding their experience and knowledge gained from the Cross Cultural Studies Program (CCSP). All interview results were transcribed and compiled to be further analyzed. Three themes emerged which included, gendered relations with Hispanic populations, difficulties programming activities for Hispanic populations, and personal gain of cross cultural immersion participants. The most common and reoccurring theme was that of personal gain attributed to participants from completing the Program. This personal gain was established in cross cultural competence, and the ability to better relate to Hispanic populations. It was also noted that although the Program was able to provide a different view point and personal gain for

participants, many were not able to transfer this into effective and successful programming for Hispanic populations in their county or respective area.

Future Plans/Advice to Others

Diversity remains an important concept in the notion of cultural competence and is vital for better understanding different groups and cultures. As the population being served becomes more diverse, so grows the need of diversity among Extension staff. After completion and analysis of the initial set of interviews it is advised that a follow up survey should be distributed to all participants of the CCSP. This survey will further explore the transformation of personal gain to professional implementation and program planning.

Costs/Resources Needed

The aforementioned experiences leave Extension professionals and educators with a unique experience that is unforgettable and allows individuals to immerse themselves in a new perspective and way of life. Partial funding for some of the Cross Cultural Study Programs has been provided by the USDA-CSREES International Science and Education Competitive Grants Program (Ames & Atiles, 2008).

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Designing Programs for Faculty Instructing Students with Learning Disabilities

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Introduction

The primary purpose of this project is to learn how teaching methods in college classrooms can enhance learning for students with learning disabilities in higher education. In order to do so, it is essential to capture and evaluate instructor ability to analyze the effectiveness of selected teaching methods, and resources, to compare the frequency of uses of accommodations for students with learning disabilities as perceived by instructors, and to determine instructor's awareness of the accommodation strategies recommended for the learning disabled students.

According to a report by the American Council on Education, "About 9 percent of all undergraduates in higher education report having a disability, a percentage that has tripled in the last two decades. This amounts to about 1.3 million students" (American Council on Education New Report Foucses on Helping Disabilied Students Succeed in College). There are 2.7 million individuals within the United States that receive help within school system because of specific learning disabilities (LD Online, 2008).

Catering to a classroom with different learning styles and disabilities can be a challenge that an instructor may have to endure in order to maximize the amount of information that is being relayed to every person in the classroom (LD Online, 2008). Learning disabilities do not avert students from learning, but simple strategies can assist and be as easy as using diverse teaching techniques to accommodate and make modifications when workings with students with learning disabilities (LD Online, 2008). One step in helping students with learning disabilities in higher education would be to evaluate different teaching methods that are facilitated in the classroom setting in order to see how they can impede or enhance the environment of learning.

Program Phases

The program directors of this project are devising a workshop for instructors to develop their teaching skills through seminars, and one-on-one consultations in order to gain insight on the best practices when working with students with learning disabilities. Individual instructors who participate in the workshops have the ability to participate in one-on-one consulting to review their problems with setting up their curriculum to better suit all students. Not only do teachers have a legal obligation to provide accommodations for students with learning disabilities but also a moral obligation to provide each student enrolled in their class with the resources and knowledge to perform at their optimal level. The workshop will allow the instructors to discover the areas within the teaching environment that are weak and perhaps allow them to cater their methods of teaching towards students with learning disabilities and disseminate this information to others.

Results to Date/Implications

The building blocks of a thriving educational setting is first considering the students needs, engaging to their senses by creating a classroom setting that is conducive to learning and then allow the student to demonstrate their knowledge. Understanding learning disabilities and creating a curriculum that conducive to fit many learning style will make the experience of learning a process that all students will benefit from. It is necessary for the program directors to

discover the knowledge that instructors have regarding learning disabilities. This program will add to the body of knowledge of enhancing the instruction of learning disabled students in higher education.

The problem that this program will address is significant because it will evaluate teaching methods and resources that are useful within the classroom setting. It will also diagnose the outlook that students have towards these resources and the perceptions of teacher's attitudes and willingness to provide accommodations, facilitate teacher resources and methods. The program can be beneficial for students and teachers alike in order to help cater to specific learning environments and disabilities. By performing the workshops it will allow instructors to gain insight on specific learning disabilities and environments or methods that can advance learning or become detrimental. Specifically these workshops will evaluate the perceived effectiveness of teaching resources and methods that are used in higher education when working with students with learning disabilities. These workshops are needed to create a better learning atmosphere for students with learning disabilities. If instructors recognize teaching tools and styles that are supportive to the environment they can cater there teaching styles to students.

Future Plans/ Advice to others

After gathering the data the program directors plan on create a curriculum that will accommodate all instructors that participate in the workshop about the set of best practices that are relevant when teaching students with learning disabilities. The workshop will focus on creating action-orientated objectives that instructors can institute into their curriculum. The workshop will also offer instructors the ability to retain relevant content that has been researched and they can better curtail their curriculum to fit the students' needs.

Cost/ Resources Needed

The cost that will be endured in order to perform the program will be heavily weighted on the workshop that instructors will attend. Projected costs are associated with faculty time to attend a workshop, as well as the time for the program director, facilitator, or faculty guests to present the workshop. Space and other workshop requirements (refreshments, printing costs, etc) would be institutionally determined.

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Developing a Conceptual Model for a Teaching Methods Course

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Developing a Conceptual Model for a Teaching Methods Course

Introduction/Need for Innovation

A universally accepted model or taxonomy outlining the plethora of potential learning activities that could be taught in a teaching methods course does not exist. Even within agricultural education, multiple approaches have been presented. Newcomb, McCracken, Warmbrod, and Whittington (2004), along with Talbert, Vaughn, Croom, and Lee (2007) divided learning activities into group techniques and individual techniques. Phipps, Osborne, Dyer, and Ball (2008) divided teaching approaches into (a) subject-matter and direct instruction; (b) personalized instruction; (c) problem-based and inductive learning; and (d) experiential learning. Both of these approaches provide some merit, but fail to present individual learning activities in a manner that allows learners to conceptualize the relationships between learning activities.

Program Phases

Upon identifying the need for a conceptual model showing the relationships between learning activities and teacher/student roles, a three phase plan was developed to address this void. The three phases are model development, model testing, and peer review. In the first phase, category names, interactions, and learning activity names were identified. After reviewing the existing literature, three category names and interactions emerged. The first category, teacher-centered activities, was defined as activities that consist of the teacher providing instruction to students with no learner-learner interaction. The second category, social interaction activities, was defined as reciprocal teaching among the students and teacher. Learning activities in this category are characterized by substantial amounts of teacher-learner, learner-teacher, and learner-learner interactions. The third category, student-centered activities, was defined as learning activities that give students the opportunity to develop knowledge from their experiences. The names for specific learning activities were derived from previous practices in the [university] teaching methods course, from Newcomb et al. (2004) and from Ball

and Knobloch (2005). As a part of the development process, other teacher educators at [university] were asked to review the model and provide suggestions.

The second phase was to use the Taxonomy of Learning Activities Model in a teaching methods course. During this phase, the goal is to evaluate the effectiveness of the model in helping students understand the relationships between learning activities and the roles of teachers and students. The model is used throughout the course to connect various learning theories and to provide a framework for the microteaching labs. This phase is currently in progress. Evaluating the effectiveness of the model will help determine if an appropriate conceptual model was created or needs further development.

The third phase is directly related to submitting this poster abstract. The purpose of this phase is to present the model in a way that will allow for evaluative feedback from other teacher educators. This will help determine if the model properly represents the relationships between learning activities and the roles of teachers and students.

Results to Date

Phase one, model development, was completed in the Summer of 2008 and resulted in the conceptual model, which is being called the Taxonomy of Learning Activities.

Implementing the model in a teaching methods course (phase two) is currently in progress. The model was presented to students in the beginning of the course as a guide for understanding the relationships between learning activities and teacher/student roles. Further instruction on how to use the model is given when a new learning activity is introduced. Preliminary qualitative results indicate that students in the course find the model helpful.

The presentation of this innovative poster is proposed as the beginning of phase three and will provide an opportunity to receive feedback on the Taxonomy of Learning Activities Model. The authors also plan to submit this poster for consideration at the AAAE research conference.

Future Plans

Based on feedback from students (phase two) and from other teacher educators (phase three), the model will be refined. If results confirm the efficacy of the model, it will continue to be used as a conceptual framework in the teaching methods course at [university]. By sharing the model with other teacher educators (phase three), it is envisioned that others may wish to use the model as a framework for similar courses. Additionally, a complementary version of the model is being considered to help frame a course focused on college teaching methods.

Resources

The only tangible resource needed for this project was time. To make use of the concept, copies of Taxonomy of Learning Activities Model (paper-based and digital) were also required.

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Developing a Diversified Program: The Madison County 4-H Youth Outreach Project

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Need for Idea

[County] County, [State] has a rich mixture of people from different economic and ethnic backgrounds. According to the latest census, people of color represent over 40% of the county's population (U.S. Census Bureau, 2007). Economically, the median household income is $29,613 per year while 20 % of the county's population lives under the poverty level (U.S. Census Bureau, 2007). While the county's 4-H program is vibrant and growing, children of color and non-traditional youth have typically been underrepresented in many of the county's 4-H initiatives. Although there are many contributing factors that may potentially play a role in the lack of participation by these groups, the [County] County 4-H Youth Outreach Program was implemented to eliminate many of these tangible barriers. With the assistance of community leaders, extension agents, and local businesses, the program is on track to enhance the educational and personal growth opportunities 4-H offers.

How it Works

Prior to the start of the program, potential students are recommended by teachers, community leaders. After recommendations are received, needs assessments were conducted by county extension agents to determine if students qualified for the program. Once identified, information letters describing the purpose of the program were sent to parents for consent. Following the initial agreement from parents and students, a second assessment is conducted to determine what type of livestock would best fit each student's ability. Once students select the species of livestock they wish to show, the county agent serves as a liaison to ensure that proper care and maintenance of the animals is being completed by the students. The goal is for students to raise and show the animal at the [County] County Fair. Funds generated from the sale of animals are placed in a trust fund under the student's name. The funds are governed by a three

signature system. Students receive the profit at the completion of high school and the entrance to a trade school, junior college, or university.

Educational Benefits

Students are required to attend monthly 4-H club meetings. Animal care, health, and nutritional needs of livestock are topics discussed. Students are also required to attend livestock showing practices that provides them with the opportunity to learn techniques of exhibiting livestock while gaining knowledge regarding shearing and fitting animals. Students are also required to be present at workshops offered at the county and district levels. The objective is to acquire more knowledge about 4-H and encourage other youth to develop an interest in agricultural education.

Results

During the first year, ten youth participated in the program. Because the program is in the beginning phases, the results of knowledge gained and change in attitude are difficult to determine. However, as the program progresses, students become more familiar with their projects. Students are attending meetings, livestock project clinics, and showmanship practices. Every student has been enthusiastic and eager to learn. The reward is witnessing students working with their families on a livestock project that would not have been possible without this program. At the conclusion of the program, the students will be required to complete a program questionnaire that will assist in evaluating their experience and improving the program.

Future Plans

The program is in the first of two years of operation. As the students progress with their livestock projects, there will be an effort to expand the youth's experiences to other aspects of the 4-H program. More specifically, the students will be recruited for leadership roles at the club level. The program will be evaluated at the conclusion of the second year for success and merit in [County] County. A needs assessment will be administered to determine if the 4-H program is effectively recruiting and maintaining underrepresented youth in the [County] County 4-H Program.

Costs/Resources Needed

The program operates on a $2000 fiscal budget provided through the [State] AgriLife Extension Service. Because many items were donated by outside resources, total operation cost is difficult to determine. A list of items needed and the source of donations is provided.

- Animals: Donations secured by the county extension agent. The donation of the animals is recorded with the local educational foundation. The foundation provides the donor with documentation for federal income tax reduction purposes.
- Feed Cost/Show Supplies: The county extension agent secured monetary donations to cover the cost of feed and show supplies from a local bank.
- Livestock Feed and Showing Supplies: The county extension agent facilitated collaboration with local feed stores to provide feed and supplies to the program, at cost to the store.
- Housing: The county extension agent coordinated with county's school district to utilize the high school agriculture farm to house animals in the program.

A local bank has agreed to fund the program in 2009-2010, however additional funds are always needed as veterinarian bills and unforeseen costs arise.

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Developing a Leadership Assessment Instrument for Cooperating Teachers

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Introduction

For years the profession of Agricultural Education has been battling with a shortage of qualified teachers, Camp, Broyles & Skelton (2002). Researchers in the profession of Agricultural Education have often noted the impact of the cooperating teacher on the student teachers decision to enter the teaching profession *(Kitchel & Torres, 2007a)*. In recent years, studies have been conducted in an effort to determine the leadership preference of the cooperating teacher and its impact when working with student teachers (Kitchel & Torres, 2007a; Kitchel & Torres, 2007b). There have also been studies to evaluate the effectiveness of the relationship of the cooperating and student teacher (Roberts, 2006; Young & Edwards, 2006).

In order to fill the many open positions each year, university teacher education programs need to effectively train student teachers and place them in cooperating teacher sites where they will build their confidence and hopefully make the decision to enter the teaching field. One way to facilitate this process is to ensure that cooperating teachers and student teachers are compatible in leader and follower style and preference.

Methodology

This descriptive study serves as step one in testing the reliability of a tool used to match student teachers and cooperating teachers. The population sample consisted of 20 purposively selected cooperating teachers who have hosted a student teacher within the past two years. The instrument used to assess the leadership preference of the cooperating teacher was the ELSI-AG (Educational Leadership Style Indicator – Agricultural Science Teacher Version). The ELSI-AG was developed by the research team and is based on Blanchard's Situational Leadership Theory (see Figure 1.).

The ELSI-AG was developed to determine the preferred leadership style of the cooperating teacher. It consists of 20 scenarios that may be encountered while working with a student teacher. Responses to each question are scored in one of four categories and respondents are labeled as a Director, Coach, Supporter or Delegator.

The instrument was reviewed by agricultural education professionals for face and content validity. Reliability was to be determined during the course of the study.
The instrument was delivered and returned online using Zoomerang. Data were analyzed using appropriate statistics within SPSS version 16.

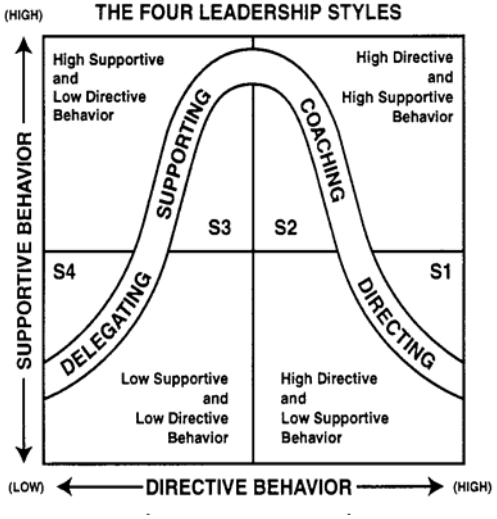

Figure 1. Blanchard's Leadership Styles and Follower Development.

Results to Date

All 20 participants responded by completing the ELSI-AG. It was determined that 5% preferred Directive leadership, 5% preferred the Coaching style, 90% preferred Supporting and none were primarily Delegators. Comments about the instrument itself included issues with question length, clarity and grammar. These have been corrected for the next round of testing.

Implications

Most cooperating teachers naturally fall into the Supporting category while we consider entry-level teachers to be in the D1 (low) category of follower development. Teachers want to support student teachers but results indicate they need direction to begin their experience. Teaching cooperating teachers to use correct situational leadership styles may lead to an an increase in agricultural education students who decide to enter the teaching profession.

Future Plans/Advice to Others

The researchers intend to continue testing and validating the instrument. A workshop is planned for the Fall 2010 semester to help cooperating teachers learn how to use their leadership styles to most effectively work with student teachers. An instrument is being designed to measure the follower development level of the student teacher.

Costs/Resources Needed

The instrument was developed and administered online. Costs were limited to labor and were minimal.

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Developing A Preservice Agricultural Mechanics Curriculum Utilizing Teacher Partnerships

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Need for Innovation

A 2008 study of Texas agricultural mechanics teachers determined that universities, state departments of education, and state teacher's associations need to collaborate to provide professional development opportunities in the area of hands-on skill development (Ford, Shinn, & Lawver, 2008). Researchers have also shown there is a need to create alternative, innovative methods for training agricultural mechanics teachers (Burris, Robinson, & Terry, 2005; Duncan, Ricketts, Peake, & Uesseler, 2006; Ford, et al., 2008; Hubert & Leising, 2000). Teachers need to be taught proper safety techniques including first aid, handling hazardous materials, providing safety instruction, conducting safety inspections, and working with student protective equipment (Johnson, Schumacher, & Stewart, 1990; Ullrich, Hubert, Murphy, & Bagley, 2002). Teacher educators in a 2005 study indicated that they felt their graduates were well prepared to teach hand tools and power tools, but that they were only somewhat or poorly prepared to teach in the other areas of agricultural mechanics (Burris, et al., 2005).

The themes from the literature reveal a need to create an innovative method for teaching agricultural mechanics to pre-service teachers in already heavy credit hour programs. Prior to this year, students at a land grant institution completed a semester online course in agricultural

mechanics that incorporated knowledge and application. After reflection on the course, the researchers concluded that students needed to have more time and hands-on instruction in subject of agricultural mechanics. A second need was determined that students need to be introduced to the subject matter of agricultural mechanics in a creative and non-threatening learning environment by removing anxiety associated with grades and utilizing formative assessments.

How the Program Works

Pre-service teachers in a master's cohort program are participating in a yearlong experience pertaining to agricultural mechanics. The first portion of the experience involves the pre-service students obtaining hands-on training in the agricultural mechanics lab. The fall laboratory sessions are held in local high schools. The schools are a part of a partnership developed during the prior summer. The agricultural teachers are helping to prepare pre-service teachers with proficiency in agricultural mechanics skills through the use of their own laboratory. Each of the pre-service students at each session received hands-on training using the tools that are traditionally located in secondary school shop environments. The fall semester course involves hand tools, power tools, carpentry, arc welding, and oxy-fuel operation. No written assignments and or grades are given during the first semester of the class. The goal of the class is to teach the future teachers how to operate the equipment and utilize laboratory knowledge and skills. Without assignments or grades, the graduate students can focus on gaining the knowledge that they will need to be successful in the high school laboratory. During the second part of the experience, the pre-service students are required to complete online modules and hands-on projects at their assigned teaching sites with the assistance of mentor teachers. The projects will be a part of the graded portion of student teaching. Each project is designed as a hands-on lesson that the student teachers can incorporate while in the high school classroom.

Results to Date

This concept has allowed the [University] to provide the equivalent of six credit hours of instruction in agricultural mechanics. Students only receive three credit hours on the transcript because the time spent in the fall is for non-credit and completely voluntary. Grades were not taken during the fall semester because of the course's voluntary status.

Five local high school programs were utilized throughout the course. The teacher(s) at each host program were given the opportunity to teach one of the lessons offered during that evening's event. University staff taught lessons not taught by the local teacher(s). The skills and tools taught in the high school locations reflect the state's secondary agricultural mechanics requirements. Pre-service teachers received an introduction to the format and style of the course. Pre-service teachers have participated in three hands-on workshops. During the first workshop, pre-service teachers were given the opportunity to learn how to use various measurement tools including a basic straight rule, calipers and micrometers. During the second workshop, pre-service teachers were given introductory instruction in oxyacetylene welding, shielded metal arc welding (SMAW,) and portable power tools. During the third workshop, pre-service teachers were involved in brazing with the oxyacetylene welders, welding with the shielded metal arc welder and instruction in portable power tools. Future instruction will involve portable and stationary power tools, shielded metal arc welders, and oxyacetylene welders and torches. The initial workshops will be completed by early December.

The course has an online scholar website that serves as a resource of agricultural mechanics teaching materials. The site includes materials from experienced teachers in agricultural mechanics, the online safety tests that were administered prior to the site visits and links to online resources that may provide assistance in teaching agricultural mechanics. The online scholar site will remain available to the pre-service teachers when they begin their student teaching assignments in the spring semester.

Future Plans

Two planned research projects have been developed and will be implemented in and during the program. The first research project will address learner needs and satisfaction of online delivery of a predominantly psychomotor context as agricultural mechanics. A second study will investigate how the absence of grades and assignments in the first part of experience enhanced intrinsic motivation toward the subject of agricultural mechanics.

Resources Needed for the Program

The resources provided by local high school program included the shop laboratory environment, the high school instructor and the tools and safety equipment to be used for each lesson. The university provided the cost for the electrodes, metal and some of the wood used for the project. The university also provided the server space and costs associated with running the website. Some of the wood was donated for the course by local businesses. The pre-service teachers provided their own transportation to the high schools that hosted the training. The pre-

service teachers also provided any safety equipment that they used through the agricultural mechanics course besides welding helmets and gloves.

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DUAL CREDIT: TRANSITION TO COLLEGE

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Introduction

Need for Innovation or Idea

Many students are "blind sided" as they leave high school and enter the world of post secondary education. They are unaware of the responsibility and good study habits required in the college setting. In many states students will lose their scholarship in the first year due to the required GPA for their particular scholarship. These students could have possibly increased their chances of maintaining these much needed scholarships if they knew what to expect in college. Dual credit and dual enrollment classes can help to alleviate this lack of preparedness for these students. Studies show that students who are actively involved in any planned area of interest during high school have a greater chance of success in both post-secondary education and when they reach the workforce, enabling them to have a better chance at high-skill, high wage, and / or high-demand occupations.

With this in mind, the primary focus of this project is to allow for any eligible student who is enrolled in Greenhouse Management in the Agricultural Education classroom in the specified school system to gain three hours of college credits while still in high school in the agricultural area. These students were enrolled in ABAS 1101, Introduction to Ornamental Horticulture Science, in the School of Agribusiness and Agriscience at Middle Tennessee State University (MTSU) while simultaneously earning high school credit in Greenhouse Management at the secondary level. This post-secondary course is required in all areas of Agriculture (or can be substituted) at the post-secondary level at MTSU. We suggest students who are following a career path in Agricultural Education at the post-secondary level begin fulfilling the necessary requirements for a post-secondary degree at the secondary level. By doing this, they will be encouraged to continue their studies in an agricultural area of study and will continue their studies beyond the secondary level.

Middle Tennessee State University, in partnership with thirteen secondary schools and enhanced by a Perkins IV Reserve Fund Grant agreed to aid in course development and serve in an oversight role as the post-secondary institution, coordinating coursework for dual credit in agricultural education at the secondary level.

Method

Our Model

One textbook is used and twelve chapters are chosen along with a CEV Multimedia Plant Biology Pathway unit. Study questions/guides are derived from each chapter as well as a powerpoint presentation for each. These are all provided to the participating teachers as well as accessible through a website. Teachers work with and supervise students to read each chapter, complete each study guide, and view the powerpoint presentations. There are four preparatory exams which are given through the university website. These exams are designed to be given after the completion of every three chapters. These four exams are designed to pyramid the student up to the final exam which is comprehensive and determines if credit is given. The secondary teacher has the flexibility to teach the course to their specifications, understanding what is expected at the post secondary institution for credit. In order to improve research and writing skills a research paper is required. Each school is visited multiple times by the dual credit coordinator, and students are then "coached" into being successful at the post secondary level by using concepts such as choosing the best courses, time management, coping with college classes, and scoring well on examinations. Concluding the course is a final comprehensive exam covering the twelve selected chapters. Scoring a seventy or above on this exam determines if credit is given.

Results

Participation

There were thirteen grant schools and twelve non-grant school participants. The following information was collected at the conclusion of the dual credit offering: 448 students participated and were exposed to the course, 1197 preparatory exams were given, 201 final exams were given, 133 students sought dual credit (these students paid the $60 testing fee), 116 received credit and 17 students did not.

Implications

It is our desire that more students will transition to a post secondary program and post secondary scholarship and graduation rates will increase at the post-secondary level. Students will be better prepared for college classes because of the integration of techniques to improve college success into the dual credit curriculum. Students, who might not have considered post secondary before, will get a sense of "I can too".

Future Plans

Current

MTSU is currently offering a second dual credit course, Agribusiness Finance/ABAS 1201. It is our plans to bring on a third and final dual credit offering. This course will be Leadership/ABAS 1301

Advice

The key to the success of this is to be sure all stakeholders are involved at all times. This would include: university faculty, high school teachers, principals and most of all school counselors. We found that when everyone is involved, the courses will run smoothly. The testing procedures need to be secure and reliable.

Resources

The initial grant provided each school with the necessary resources to offer the course. However, most schools have these resources in place. Textbooks, projector, computer and internet access are needed. Additional cmputers for student use are also beneficial.

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Extreme Agricultural Education: Identifying Innovative Agricultural Education Programs That Address New Markets

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Introduction

According to the 10x15 Long Range Goal for Agricultural Education, by 2015 there will be in operation 10,000 quality agricultural science education program serving students through an integrated model of classroom/laboratory instruction, experiential learning, and leadership and personal skill development. One approach to achieving this goal is to identify and replicate innovative program designs that are sustainable. The goal of this project is to find those programs that are "extreme" in their approach to classroom instruction, supervised agricultural experience and FFA activities while meeting community and industry needs in new venues.

An innovative program may be defined as a program that is new and creative, especially in the way that something is done. Roger's (2003) defined innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. Is it possible that many innovative programs are overlooked because they are not perceived as new? Many programs are defined by quality indicators such as success in career development events or national chapter awards, but little attention has been given to identifying or measuring the "innovativeness" of programs that are serving a totally different audience than traditional agricultural education programs serve.

With the help of key stakeholders from each state, this project will identify and showcase the programs that may not be identified or rewarded through our current awards and recognition system. Locating the innovative/extreme programs, identifying and describing their innovative practices, and replicating the tangible aspects of program design and delivery will be a huge step toward our ultimate goal of 10,000 quality programs.

Methodology

To identify innovative programs, the researchers will contact a wide variety of stakeholders in agricultural education to identify as many innovative programs as possible. Carefully framed questions will be addressed to the following groups: 1) State Agricultural Education Supervisors, 2) Teacher Educators, 3) State Agricultural Teachers Association Leaders, 4) CTE Directors in major metropolitan areas, 5) National FFA LPS Specialists and 6) Agricultural Education Materials/Specialized Equipment Dealers .By involving a wide variety of subjects in this mode of data collection, the researchers believe that these professionals will have a sense of truly innovative programs that are "extreme" in nature.

After the innovative programs have been nominated, the researchers will obtain consent of teachers and others in these programs to participate in a study of their practices and procedures – their innovative techniques. These programs may exhibit many characteristics that are found in typical agricultural education settings. One consideration the researchers will have in determining the innovativeness of the program is if the program is innovative from a local, regional, or national standpoint. What are the characteristics that will place these programs in the innovative/extreme category? 1) Innovative uses of technology, 2) Creative contexts for teaching agricultural education, 3) Delivery to new audiences (e.g., home school, distance education), 4) Unique settings for delivery of programs, 5) Highly specialized training programs (e.g., Certified Vet-Tech, Certified Welders, Meat Processing Facility).

Results to Date/Implications

The project has been funded by the National Council for Agricultural Education. The sampling frame for each group of participants has been identified and initial contact has been made with: 1) State Agricultural Education Supervisors, 2) Teacher Educators, 3) State Agricultural Teachers Association Leaders, 4) CTE Directors in major metropolitan areas, 5) National FFA LPS Specialists and 6) Agricultural Education Materials/Specialized Equipment Dealers. Participants have been asked to provide detailed contact information for the innovative programs they identified so that the researchers may follow up with them individually.

Future Plans

After the identification of the programs is complete, the researchers will send each innovative program a digital video camera and memory card to document the programs innovative strategies. The target is to identify 3-4 innovative/extreme programs per region. As part of this project, researchers will create a website to showcase these 12-16 innovative/extreme programs. This website will include information valuable in disseminating and replicating the innovative ideas for program design.

Costs

The National Council for Agricultural Education has provided $15,000 for this project. Additional funding will be sought. If additional funding is acquired, the researchers will conduct focus groups at two to three programs per region throughout the U.S. and capture in-depth qualitative data through interviews of students, teachers, school administrators, and program stakeholders. Additional media elements will be captured and created to more thoroughly describe and communicate the characteristics and practices of extreme programs. We are developing a request for funding to be shared with selected donors, estimating $1,500-$2,000 per extreme program to extend this project.

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FOCUSed on "You for 2"

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Introduction:

The Agricultural Institute (AGI) at North Carolina State University (NCSU) is part of the College of Agriculture and Life Sciences. Founded in 1959, AGI gives students the opportunity to earn the Associate of Applied Science degree in nine different majors relating to the agriculture industry. With a technical education, graduates of AGI enter the workforce prepared to become leaders in the industry.

Over the past five years, enrollment in AGI has fluctuated causing reason for concern among the administration. The number of incoming students has not kept pace with the number of students graduating. Enrollment management issues have impacted budget allocations, class scheduling, use of facilities, and faculty teaching loads. AGI leadership recognized an imperative need to evaluate the recruitment and retention methods being used. New and innovative strategies were needed to attract students and produce the qualified graduates needed to meet industry demand.

In 2008-2009, AGI leaders conducted a S.W.O.T. analysis and refocused the mission, vision, and goals of the program. Personal and Organizational Development Services at NCSU processed the results. Industry leaders were also consulted to ascertain their expectations of graduates and the importance of AGI to the industry. Based on results of the analysis, a variety of recruitment tools were developed including an informational video, banners, pamphlets, and postcards. Communication Services professionals evaluated the visual and video products. To further determine the impact of these materials and messages, there was a need to collect feedback from the program's stakeholders: the students.

Methods:

Recent research has shown that focus groups are an effective method of involving stakeholders in program evaluation and direction. Often, these groups "solidify a course of action" and support or discredit the existing evidence (White, Arnold, & Lesmeister, 2008). Thus a focus group was established to assess the new recruitment materials and strategies and, in general, the program mission. Krueger (2009) indicates that a focus group is composed of 4 to 12

individuals who are similar in one or more ways and guided through a facilitated discussion on carefully planned topics. Twelve students from the five AGI introductory orientation courses were nominated by their instructors and invited to participate in the focus group. Nine students representing five majors agreed to participate. A facilitator, not involved with the development of the new program focus and recruitment materials, led group participants through a set of predetermined questions. The session was audio recorded.

Results to date/Implications:

1. How did you hear about AGI?
   The majority of the students reported hearing about AGI from family members and friends who had been students in AGI. Student organization leaders (FFA and 4-H) and teachers also played a major role in informing students about the program.

2. What motivated you to attend AGI?
   The focus group members agreed that the motivation to attend AGI was the opportunity to be a part of a high quality program at a well respected university and still earn a degree in just two years. In addition, AGI offered an easier transition into college from high school.

3. What expectations did you have coming into the program?
   Many of the students had been told about the program by people who had experienced it first-hand. As a result, they expected smaller class sizes, hands on learning experiences, and professors that truly care about the students. However, some members of the group admitted to being unsure of what to expect.

4. Which expectations have been met? Which expectations have NOT been met?
   All of the group members reported that their expectations thus far had been met. However, for the future, the students stated that they would like to see more variety in course offerings. The group recommended considering courses and curriculum in the areas of aquaculture, dairy, small ruminants, and equine.

5. Do you feel the attributes mentioned in the recruitment video accurately reflected your experiences this fall?
   After viewing the new recruitment materials, the focus group concluded that they accurately portrayed AGI. The participants strongly agreed with the overall message of the media products.

6. In the future, what strategies would you use to recruit students to AGI?
   The participants felt that it was important to distribute the materials and information about AGI on a personal level to individuals who may be interested. They also supported using current AGI students as representatives in classrooms and at college fairs to draw in more students. The group also recognized a need for NCSU recruiters to promote AGI at all recruitment activities.

Future Plans/advice to others:

Based on the success of this study, the following conclusions and recommendations are offered:

- Institutions similar to AGI would greatly benefit from the use of focus groups in program evaluation and recruitment material development.
- A follow-up study should be conducted with the participants of this focus group study upon their graduation to determine if their views changed after progression through the program.
- An advisory committee should be re-established to review current curricula as well as the potential and cost for the adoption of new program areas.
- Every effort should be made to include current students in the process for recruiting prospective students.

Costs/Resources needed:

The cost of conducting the focus groups was very minimal. The major expense involved the production of the new recruitment materials. A hand held tape recorder was acquired from the library. A comfortable AGI conference room for the facilitator and participants was used.

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Implementing a Workshop Evaluation Instrument Based on Satisfaction Attainment Theory

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Introduction

Within the contextual area of Agricultural Education in Domestic and International Settings: Extension and Outreach in the *National Research Agenda (NRA): Agricultural Education and Communication 2007-2010* (Osborne, n.d.), an identified research priority area is to identify and use evaluation systems to assess program impact. Kirkpatrick (1994) said evaluation is needed to make sure training or workshops are meeting an organization's goals, to determine what information should be included in trainings, and to decide if additional training programs are needed.

The International Center for Food and Industry Excellence (ICFIE) hosts many workshops to educate industry professionals in improving food safety at both the pre-harvest and post-harvest levels. These workshops take place both in the United States and internationally. ICFIE continues to seek new and innovative ideas to improve their food safety workshops. Moreover, ICFIE strives to provide workshop participants with clear, concise information that will help improve the safety of the food production system. Currently, IFCIE personnel use a variety of instruments to evaluate the effectiveness of their workshops.

One method to develop an evaluation instrument it to use the Satisfaction Attainment Theory, which is a causal model of meeting satisfaction based on three constructs: satisfaction outcomes (SO), satisfaction process (SP) and perceived net goal attainment (PN) (Briggs, de Vreede, & Reining, 2002). ICFIE uses an instrument based on the SAT to evaluate the participants' satisfaction of workshops. Before this theory was implemented for instrument development, ICFIE had no standardized model of evaluating workshops. The purpose of this project was to test an instrument for workshop evaluation developed using the SAT.

Methodology

Data were collected on June 17, 2009 at a workshop for food safety at the pre-harvest level. Participants included 30 beef industry professionals. At the conclusion of the three-day workshop, each participant was asked to complete the workshop evaluation instrument. This instrument consisted of 15 items with five items representing each of the three SAT constructs. All 30 instruments were completed and collected by the researchers. Analysis was conducted using SPSS version 16.0.

Results/ Implications

Analysis of the three constructs can be seen in Table 1. Reliability scores within the three constructs were adequate indicating consistency of response on like items. Measures of central

tendency were high and similar between constructs indicating satisfaction in all areas on the part of the participants. This instrument appears adequate for providing evaluation data to the researchers for the purpose of future improvement. The three constructs allows workshop presenters to focus on improving specific areas when participant satisfaction decreases in a single construct area.

Table 1. *Construct reliability and measures of central tendency (N=30)*

Construct	Reliability Cronbach's Alpha	Mean	Mode	Standard Deviation
Satisfaction with Outcomes (SO)	.96	6.00	6	1.17
Satisfaction with Processes (SP)	.97	6.11	6	1.02
Perceived Net Goal Attainment (PN)	.94	6.17	6	1.15

Note: 1=Strongly Disagree, 7=Strongly Agree.

Advice to Others/Future Plans

Results of this trial lead researchers to adopt the instrument grounded in SAT at future workshops. In order to maximize the effectiveness of participant satisfaction in workshops, the researchers have three recommendations. First, the researchers propose the future use of the SAT instrument to evaluate satisfaction in various workshop settings. Second, work should progress on validating this as a universal instrument workshop satisfaction, and finally, research should be conducted to determine relationships between participant satisfaction and other variables associated with evaluation methodologies.

Costs

Costs for the project were immersed in both faculty and graduate student labor to evaluate the instrument.

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Modeling Service Learning in the Undergraduate Classroom

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Introduction

The National Service Learning Partnership defines service learning (SL) as "…a teaching method that engages young people in solving problems within their schools and communities as part of their academic studies or other types of intentional learning activity…" (www.service-learningpartnership.org). Service learning is a powerful teaching tool that many educators can incorporate into their curriculum to help foster a different learning method in their classrooms. Many advocates of SL refer to John Dewey's idea that learning is tied inextricably to experience, and that students will learn more when they see clear connections between academic subjects and the real world (Dewey, 1916). "Teachers often find that service learning projects provide a learning environment conducive for addressing…goals in student self determination, as student autonomy and decision making power in strongly encouraged in service learning practice" (Conner, 2009, p.14). The idea of SL came about during the New Deal Era under President Roosevelt. Roosevelt created the Civilian Conservation Corps to help rejuvenate the nation (www.service-learningpartnership.org). Service learning is a great way for universities and agriculture science programs to foster strong working relationships. It allows the students to

build a relationship with the agriculture teachers which in turn will assist them as they continue into their teaching careers. The opportunities for agriculture educators are there, teachers just need to link those SL opportunities to the curriculum being taught. By modeling SL in the undergraduate curriculum, pre service teachers are instructed how to link SL in the undergraduate agricultural science curriculum and in turn relationships are strengthened between the post secondary institution and the community which it resides in.

Methods/Steps

In order to integrate a Service Learning (SL) project into the curriculum of an undergraduate teacher preparation program in agricultural education the authors followed the steps outlined by O'Connor (2009). These included:

1. *Preparation*
    - Identify and discuss the following a) Community problems that might be addressed in a project, b) Possible solutions, c) Possible resources, d) Learning objectives and standards that will be addressed in the project and e) The goal of the selected project.
2. *Planning*
    - a) Have students organize the project, b) Define roles and responsibilities of the students, c) Define how learning objectives and standards will be addressed, d) Identify community and school partners, e) Form a plan of action and set a timeline and f) Anticipate likely problems and form strategies for controlling or solving them
3. *Carry out project*
    - Provide structured opportunities for students to document the project, give feedback, and discuss possible problems and solutions
    - Provide structured opportunities to discuss the meaning of the project in class
    - Provide feedback to students on their work and collaborative skills
4. *Reflection*
    - Provide students with structured opportunities to reflect on the significance of the project, after it is completed
        - Analyze the significance in the community, academic significance, their own personal roles, and their cognitive and emotional reactions to the experience

The SL projects selected over the course of two semesters in the Agricultural Mechanics course included the constructing water cooler stands for a local high school's athletic department and electricity wiring boards for a local high school's agricultural science department.

Use it in YOUR program:

Include lessons that involve the inclusion of SL activities in the agricultural mechanics laboratory.

Require pre service teachers to formulate a list of SL activities, discuss identifying partners and stakeholders, to identify SL activities/projects that can be accomplished through their High School agricultural science program.

Results

The SL activities completed have strengthened the relationship between the university and the local high school. Relationships with the agricultural science teacher and the Career and Technical Education director have particularly been strengthened. Students enrolled in the course have learned the purpose and benefits of conducting SL projects within the classroom. Students have also compiled a list of potential SL activities that can be done within an agricultural science program and have discussed the logistics of planning and conducting a SL project once they are agricultural science teachers.

Future Plans/Advice for others

The concepts of SL are appropriate in many courses, and emphasis should place on incorporating SL activities throughout the agricultural education program. Post secondary teacher preparation program should lead by example; indentifying and completing SL activities systematically within their undergraduate curriculum and modeling the PROCESS of using SL as TEACHING Method.

Create and maintain strong partnerships with local community organizations, this requires systematic planning and frequent communication.

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Recruiting Future Agricultural Education Students into the Teaching Profession: The Development of an AGED CDE

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Introduction/Need for Innovation

In recent years with retiring personnel and a lack of new prospects, agricultural education has faced a shortage of teachers (Kantrovich, 2007). Therefore, a need exists to recruit additional pre-service agricultural education students into the teaching profession to fill the vacancies.

One means for recruiting additional students into the agricultural education major is through the development of a career development event (CDE) for secondary agricultural education (AGED) students. Bandura (1986) discussed the influences and decisions made early in life begin to affect the choices an individual makes toward their future career. As such, the development of an AGED CDE would enable students to discover and explore the prospects of a teaching career.

On its most foundational level, the basis of a CDE is to help motivate, encourage and grow students into successful young individuals while offering insight to possible career fields in agriculture. CDEs should:

- Include problem solving and critical thinking;
- Promote an appreciation for diversity by reducing barriers to participation;
- Promote new directions and focus on future needs of members and society;
- Include cooperative activities, where appropriate;
- Encourage broad participation among members and recognize excellence within levels of experience;
- Recognize individual and team achievement, develop general leadership and recognize levels of ability;
- Provide local recognition for superior performance at the state and national level.

(National FFA Career Development Events Handbook, 2006)

Currently, the National FFA Organization sponsors 24 CDEs. However, none of these relate directly to agricultural education. So, where do secondary students learn about the agricultural education teaching option at the secondary level? With the growing need to fill the void produced by retiring agricultural education teachers, it is the time to explore new avenues related to student recruitment into the field of agricultural education. An AGED CDE could aid in that effort.

How it Works

A set of seven fundamental guidelines has been developed for the AGED CDE contest.

1. Contestants will create a lesson plan and teach a lesson on the assigned core subject area assigned at the release date of the topic (one month prior to the contest.). Lesson plans must be submitted to the superintendent one week prior to the competition.
2. Lesson topic shall be assigned from one of the following core subject areas: Food Products and Processing Systems, Plant and Soil Sciences, Animal Systems, Power, Structures and Technology, Natural Resources and Environmental Science, Agricultural Communications, and Agribusiness and Management.
3. Contestants will be provided with human interaction (i.e., a "class" of students will be provided at the contest in which competing students will teach).
4. The lesson will be a maximum of 15 minutes in length. A maximum of 5 minutes for questions and answers will be allotted.

Results to Date

A series of scoring rubrics has been designed for the three facets for the AGED CDE. Specifically, the CDE will be scored on three criteria: 1) Lesson Plan – overall structure and clarity, resources listed, punctuation, spelling, and grammar, activities planned, completeness of plan, and general appearance and layout (*100 points*); 2) Delivery of Lesson – structure and clarity of presenter, presenter's oratory, effectiveness of teaching method used, and portrayal of effective teaching characteristics (*120 points*); 3) Questions – Students' overall ability to answer questions related to core subject area, method used, and the teaching process (*30 points*); 4) Exam – Students will be tested in the area of teaching (*100 points*). Contestants will be ranked according to all four rubrics from high to low to determine a winner. Specifically, nine contestants have submitted lesson plans for the AGED CDE competition. Topics range from ear notching and scrapies to administering immunizations and learning about animal science careers.

Future Plans

The inaugural AGED CDE competition will be held November 2, 2009 at [State] land-grant campus. The Livestock Industry has been selected as the topical area for which students will plan and compete. Upon completion of the event, suggestions for improvement will be considered. Then, the event will be shared with the National FFA Organization with the hope of adding a national qualifying event in the future. Competing students will be sent letters of appreciation from departmental faculty to include valuable information about the agricultural education major and career (i.e., starting salary, plan of study, state agriculture teacher supply and demand, etc.) in an attempt to recruit students into the major.

Resources Needed

Three graduate students and one faculty member will serve as judges for the AGED CDE. Current [State] AGED majors (~5 per room) will serve as "students" for contestants to interact with if needed. Two rooms will be reserved for competition. Students will be split in half and randomly assigned to a room. Efforts have been made to establish inter-rator reliability among all judges. Further, an LCD projector and laptop computer will be supplied by the superintendent. Finally, plaques for first, second, and third place individuals will be awarded to the winners of the contest.

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Teaching Controversial Issues Through Guided Group Discussion – An Approach To Cognitive Dissonance And Conceptual Change

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Introduction

Many controversial issues relate to agriculture. Consequently, much of these topics become infused into agricultural education curriculum. Examples are environmental matters, such as sustainable agriculture, or biological themes - genetic engineering for instance. Often, these issues entail conflicting ideas and values (Cotton, 2006a). For example, agricultural education teachers are unsure about the potential for sustainable agriculture to enhance the quality of life for famers and society (Agbaje, Martin, & Williams, 2001). It is questionable whether teachers can maintain neutrality when teaching such topics. The rhetorical nature of controversial issues suggests that teacher neutrality may be impractical and "the idea of maintaining a neutral position is portrayed as an illusion" (Cotton, 2006b). This viewpoint, then, begs the question, why teach controversial issues and, if taught, what is the best method for instruction?

Teaching about issues that are controversial, while requiring a lot of time and preparation, has been viewed as a useful tool for preparing students to become effective citizens (Soley, 1996). A healthy democracy is based on the nature of open discussion about issues of public concern. Therefore, it is critical that young citizens be trained in the discussion of social, political, and economical policies that are controversial (Harwood & Hahn, 1990). Additionally, it serves as an appropriate way for students to learn about values and value conflicts. Another advantage of such instruction is the encouragement of thinking. Assessment that measures students' ability to regurgitate facts requires low levels of thinking; however, teaching controversial issues requires in-depth study, on the students' part, consideration of facts versus opinions, and critical examination of the issues. Learning how to approach, investigate, and form an opinion on controversial issues that may present cognitive dissonance can also serve as a bridge for assisting students in dealing with their own personal conflicts (Soley, 1996).

When introducing controversial issues, adopting a stance that is non-committal and neutral is critical (Asimeng-Boahene, 2004). "Everything the teacher does, as well as the manner in which he does it, incites the child to respond in some way or another, and each response tends to get the child's attitude in some way or the other" (Dewey, 1933). After selecting the issue to be discussed, teachers must prepare students for the discussion, provide an adequate amount of information sources, ensure an intellectual balance, and encourage equal participation. It can be argued that teaching the facts or concepts is easier and more straightforward than helping students examine attitudes, values, and beliefs associated with controversial issues. However, if students do not learn to address moral dilemmas and argue social issues in school, when will they? It is the responsibility of teachers to supply a format for learning how to identify controversy and labor through it (Asimeng-Boahene, 2004).

How It Works

Teaching controversial issues through guided group discussion involves many steps. First, the instructor identifies a subject that is controversial in nature. Once the topic has been identified, the teacher then performs a quick review of the topic to discover the various aspects of controversy. After this, the educator creates a list of neutral research questions that focus on the characteristics of controversy – these will later be given to students. At this point, it is necessary to inform students that they will be participating in a group discussion on a controversial issue and provide an explanation, or framing, of what this activity will look like in action. During this explanation, it is critical to emphasize that students maintain a neutral position during the discussion – at no point in this activity should the teacher or other students be able to identify an individual's stance on the topic. Next, students are presented the controversial topic along with the neutral research questions and instructed to answer these questions, individually, in preparation for a group discussion – deadlines must be associated with this assignment and a date for the discussion should be set. Finally, the discussion takes place with the teacher serving as the moderator, probing the students with neutral questions, facilitating equitable talk time amongst participants, and preventing the discussion from becoming a debate. During the discussion, participating students take notes on various points that are made - at the conclusion of the discussion, each student is asked to formulate a position on the topic and articulate this position in a closing statement that references specific points of discussion.

Implications

This method of instruction has many implications for agricultural education. Because information presented in the discussion might create cognitive dissonance for some students, it is possible that conceptual change could occur. Teaching through guided group discussion provides agricultural educators with a vehicle for instruction that allows them to maintain a neutral position. This removes concern that personal views may influence the opinions of students, leaving the student accountable for his or her own conceptual change. Additionally, this technique encourages higher order thinking, where students move beyond the lower levels of Bloom's Taxonomy, and participate in the analysis, synthesis, and evaluation of controversial issues. For students, this approach fosters an investigation into opposing viewpoints and

cultivates an awareness of both sides of a topic. Furthermore, participating in discussion, rather than debate, eliminates a hostile environment and encourages open dialogue.

Future Plans

Virginia Tech graduate students are designing a research study that will involve undergraduate students enrolled in the course titled Communicating Agricultural and Life Sciences in Speaking. In this study, students will participate in small group discussions according to the steps identified in the methodology section. Prior to the group discussion, students will be given a Likert-type pretest to determine attitudes toward specific controversial issues. After the discussion, students will be given the same instrument in a post test. Results of these surveys will be analyzed to determine the degree of conceptual change that may occur.

Resources Needed

This method of instruction requires research tools such as library resources, computers with internet access, and periodicals related to the subject. Other resources needed are neutral questions, prepared by the instructor, which will help guide the group discussion. For the research study that will be conducted, topic specific attitude surveys will be required.

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The Need for Alternative Fuels and Bioenergy in the 21st Century: Implications for Secondary Agricultural Education Curriculum Integration

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Introduction

The United States' dependence on foreign oil has sparked interest in research in developing alternative fuel sources (i.e., ethanol and biodiesel) for automobiles. The dependence of foreign oil has also led to several pieces of legislation including the Energy Independence and Security (EISA) Act of 2007. EISA states that all vehicles, staring in 2011, shall have a combined fleet average of 35 mpg, and/or be capable of using alternative fuels or alternative fuel blends (EPAct Transportation Regulatory Activities, 2009). Alternative fuel blends contain low percentages of biodiesel or ethanol blended with diesel fuel or gasoline, which can be used in all current diesel and gasoline engines. The purpose of alternative fuel blends is to allow vehicles lacking the capability to use pure alternative fuels the ability to utilize a cleaner burning fuel (Fuel Blends, 2009).

With the increased interest in the development of alternative fuel consumption, opportunities for future education on careers related to alternative energy for secondary agriculture students exists. An alternative fuels curriculum at the secondary level would enable students to obtain technical, science-based content specific skills offered in the context of agriculture (Roberts & Ball, 2009). Using science content in an agricultural context leads to a

"skilled agricultural workforce and successful citizens that are agriculturally literate contributors in a democratic society" (p. 87).

How it Works

Currently, this state has two courses at the secondary agricultural education level in which alternative fuel integration would naturally occur – Agricultural Power and Technology (AP&T) and Natural Resources (NR). Students enrolled in AP&T courses learn a variety of content to include internal combustion engines, and compression engines and their fuel sources. Integrating alternative fuels into AP&T courses will allow students to experience firsthand how to manufacture and modify alternative fuels and equipment. Additionally, students enrolled in NR courses are introduced to a variety of renewable resources. As such, the NR curriculum should include content on alternative fuels and how they are produced (i.e., corn, switchgrass, sorghum and soybeans).

Results to Date

Roughly 80 hours have been invested in searching for how alternative fuels are being integrated into secondary agricultural education programs. The following search engines were accessed: Google, Google scholar, and ProQuest. In an attempt to refine searches, the following key words were included: alternative fuel curriculum in agricultural education, alternative fuel curriculum + agriscience, alternative fuel curriculum, alternative fuels + high school agriculture classes, integrating alternative fuels into secondary agriculture classes, and biofuel curriculum. These searches have resulted in limited information, with no results recognized in the context of agriculture. The most prominent source of curriculum found is from the National Energy Education Development (NEED) Project (2004). NEED has developed lesson plans for 4th graders through 12th graders. NEED has a database of lessons including content in three areas: Alternative Fuels, Ethanol, and Biodiesel.

Future Plans

The future plan of faculty at this [State] institution is to provide secondary agricultural education teachers with quality instructional materials related to alternative fuels and biodiesel. As such, research will be conducted by querying secondary agricultural education teachers to determine their needs related to the topic. Once identified, the lead researcher will begin composing new lessons for secondary agricultural education teachers that meet state and national standards (i.e., math, reading, science and agriculture). Integrating core subjects into an agricultural context provides students a better understanding of the core subjects (Roberts & Ball, 2009). Further, once lessons are developed, online modules will be constructed in which teachers and students can access curriculum materials. Specifically, these modules will allow for digital game based learning (DGBL), which is an interactive learning strategy that uses video games to reinforce information from the lesson (Coffey, n.d.) through simulations. Lastly, once modules have been devised, professional development and in-service will occur for teacher training and preparation related to using DGBL to integrate alternative fuels into secondary agricultural education curricula.

Costs/ Resources Needed

There is a need for two graduate students, one Ph.D. student in Agricultural Education to review and write curriculum and one Masters student in Computer Technology to produce the DGBL modules.

Resources	**Cost**
Ph.D. Agricultural Education Student	$22,000.00
Masters Computer Technology Student	$13,000.00
Flash Technology	$0.00
Professional Development and Inservice	$5,000.00
Total	**$40,0000**

Resources

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Transforming Education in Agriculture for a Changing World

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Introduction

Colleges of agriculture and related sciences are in the midst of a national movement that is designed to improve teaching and learning in the agricultural sciences, preparing graduates for future careers and additional study as they prepare to become part of the global society. Representatives from academics and industry have met to discuss various aspects of what needs to be done to effect change. Since much of the proposed changes center on curriculum and instruction in agriculture, and since agricultural teacher education is well-equipped to provide leadership, this poster addresses the needs and proposes ways in which agricultural education can partner with others in the agricultural sciences in curriculum and teaching endeavors. For the past several years, the Academic Programs Section of the Board on Agriculture Assembly of the Association of Public and Land-grant Universities (APLU) has been involved in a series of events to address the question, "What should programs in agricultural sciences in the public universities in the United States be like in the future in order to prepare graduates for the world of work in the twenty-first century?" That theme is evident throughout the various reports of the Kellogg Commission (1997). This poster will summarize findings from previous writing, meetings, discussions and workshops and review some forces of change and factors of resistance in terms of program changes, and then propose ways that agricultural teacher education can provide leadership in effecting change.

Program Phases To-Date

From various sources in the literature, most notably the work of Kunkel and others in 1996 and 2001, five forces of change that affect the curriculum have been identified. Those are resources, demographics, science, mission, and industry. A second area of influence is factors of resistance. These include mission, resources, philosophy and leadership. An examination each of these will lead to a better understanding of what external and internal forces might be considered to effect change in teaching and learning through curriculum reform. The Academic Summit held in 2006 addressed six important topics for consideration, namely how people learn, student learning, culture and curriculum, practical experience, articulation, and globalization. The various conferences and presentations culminated in a publication of The National Academies titled *Transforming Agricultural Education for a Changing World* (2009). Of the nine steps for achieving change, three should be of particular interest to agricultural teacher education. They are curriculum development, student development, and teaching enhancement.

Implications for Agricultural Teacher Education

Agricultural teacher education has an important role to play as colleges of agriculture and related sciences address these important issues. Agricultural teacher education must be *partners with* rather than *in service to* the various disciplinary units within the colleges. Just as plant pathologists and entomologists partner with horticulturalists in striving to solve the issues of the fruit industry, teacher education must identify its rightful place in enhancing teaching and the curriculum. The following are suggested ways for that to occur.

Future Plans and Opportunities for Agricultural Education

Curriculum development

A course is included in the curriculum generally for one of two reasons – it has always been taught, or someone identified a new topic and developed a course. Much less frequently, faculty first identify what it is that graduates need to know and be able to do and then design the curriculum that meets those needs. Teacher educators are experts in helping address the National Academies focus on curricular change.

Teaching enhancement

The one source of variance in student achievement that can be manipulated by the instructor is teacher behavior. The landmark work of Rosenshine and Furst (1971) provides evidence of selected teacher behaviors that are related to an improvement in student performance. Again, teacher educators are experts in this field and can conduct research and in-service education to address the needs.

Student development

Several agricultural teacher educator programs include instruction and other scholarly pursuits in the area of leadership education and leader development. Agricultural education programs should step to the forefront in conducting development activities, research and in-service education for students within the colleges to help prepare new leadership for the agricultural industry.

Resources Needed

The amount of resources needed could be negligible, depending on the expertise and availability of faculty. In the best-case scenario, the agricultural teacher education program could be subsidized by the college and/or other departments for providing leadership and programming in the focus areas enumerated by the national study.

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Transforming leaders through international experiential learning: A synergistic collaboration between nonprofit and academia

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Introduction

The increasing trend of globalization has amplified interest in international education. A survey conducted for the Association of American Colleges and Universities reports more than 60% of employers polled believed recent graduates lacked the skills to succeed in the global economy (Fischer, 2007). The Committee for Economic Development (2006) also makes the plea to enhance our current educational system through the strengthening of foreign language skills and international awareness of students. Industry is clearly sending higher education a message concerning the need for international education and rightly so, institutions need to address this issue. This program aims to move beyond a traditional educational approach engaging students in a synergistic collaboration allowing students to learn from leaders in the development and professional sectors of the industry. Through experiential learning, students expand their needs and expectations of learning to a higher level while increasing their confidence and motivation for careers in the global economy.

Program Framework

As a result of this interest in global education, a collaboration of organizations developed an educational experience and international program based upon experiential learning and leadership for college students. The International Collegiate Agricultural Leadership (ICAL) program has been a successful model providing the opportunity for collegiate students from various academic disciplines to gain a valuable life experience transforming their views of agricultural development, leadership, and cultural awareness.

As the concept for the program was developed, staff from both the National Grains Council and the National FFA Organization came together to determine the educational objectives for the program. The two-week intensive experience begins with cultural training and

orientation where students are briefed on economic trends, trade issues and policies, and cultural components of the countries visited.

This program is validated and disseminated through the educational frameworks of Bloom's Taxonomy (1956) and Kolb's Experiential Learning Model (1984).

With Bloom's (1956) categories for the cognitive domain, the program objectives address:

- Knowledge: Identify information about the cultural, economic, and development of the respective countries through training and prepared resources.
- Comprehension: Understand complexities of the economies in respective countries through site visits to various sectors of the agricultural and food industry.
- Application: Apply knowledge and demonstrate learning by conducting a SWOT analysis of each country.
- Analysis: Identify current trade and cultural issues of each country; Discover careers in international development and marketing.
- Synthesis: Create a presentation explaining findings from SWOT analysis presented at end of visit to host country stakeholders.
- Evaluation: Describe experience and relate to educational interest through reflective journaling and presentations to local, state, and regional agricultural groups.

Kolb (1984) also provides a framework for the experiential learning component of this international program. The four stages of the experiential learning cycle are demonstrated through:

- Concrete Experience: Student actively participates in the experience through travel to a foreign country, visits to various industry sectors and cultural offerings.
- Reflective Observation: Student reflects through journaling and the development of a presentation summarizing his or her experience abroad.
- Abstract Conceptualization: Student conceptualizes through the SWOT analysis and presentations.
- Active Experimentation: Student applies new learnings to academic discipline and leadership situations.

Results to date

This powerful program takes students through a wide range of educational and cultural encounters resulting in a transforming experience. ICAL has been in place since 2006 traveling to the countries of China, Egypt, Morocco, Spain, and Vietnam. The management of this program relies upon the consultation of industry professionals and knowledge of emerging world markets for agriculture. As a result, the location and focus of the program from year to year is in line with recent trends, technology, and issues facing agriculture on a global scale. Consequently, students share their experience and transfer information and knowledge to others through education and their chosen careers.

Only the top 12 applicants are selected for the program each year. This allows the focus to be on tailored educational development and individual growth for each student. While a selective program, it has given 48 students the opportunity to engage in agricultural education on a global scale.

Future plans and resources needed

While onsite contacts in the countries and sponsor support are necessary, equally important are the partnerships fostered with academia across the nation. These connections aid in the recruitment of students for this selective program. Therefore, continual support is needed from professionals in academia by recognizing and encouraging students to take part in this program. By doing so, such discussions will foster global dialogue in the collegiate agricultural classroom.

An additional goal of this program is to engage past participants, sponsors, and the continual network of career and educational opportunities for students interested in global opportunities. Linking students with industry will further individual career goals while fostering further reflection and evaluation of the program. Many businesses and organizations will continue to depend on students' abilities to cooperate and interact with other cultures and communities around the world (Committee for Economic Development, 2006).

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Understanding Disabilities through Experience in Agriculture Education Classrooms

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POSTER PRESENTATION:
Innovative Idea

Introduction

As agriculture education classrooms become more diverse, it is necessary that agriculture educators stress the importance for students to express empathy for persons with disabilities in the community and the school. In high school it is often common for students to make fun of others who are different than themselves. Too often, this is overlooked because it has become a common practice for students to be cruel to one another.
Agriculture educators have the special opportunity to incorporate leadership and teamwork into classroom lessons. "Incorporating tolerance and empathy is equally important" (Cook, 2004). This lesson gives the students an opportunity to express empathy as well as work on teamwork.

How it Works

As students walk into the classroom, they are randomly assigned a disability. One important aspect is that the students do not get to choose their disability. Some examples of possible disabilities may be, blindness, no arms, nub hands, one arm, only thumbs, etc. Other disabilities such as tunnel vision, peripheral vision, deafness, etc. can be used if time and materials allow. Students should not be given any instructions until they are broken into groups. For time, it is best to have the students divided into pre-determined groups of three.
Once in groups, the students will be instructed to come up with a group name in one minute. Then, the following instructions should be given: "Your goal is to make as many paper airplanes as you can in 15 minutes. You may not remove your disability, you may not cheat, and you must build your paper airplanes with your disability. Then, you must write your group's name on the

paper airplane. Since you are in groups of three, each person in your group must have a specific job. One person will build the airplane, one person will write your groups name on the airplane, and the third person will be the airplane launcher. You have one minute to decide who will do each job. You may help each other but the person assigned to the job must complete their job. If you are caught doing another person's job, your airplane will be thrown into the trash! You are encouraged to help each other. When time is up, the airplanes will be launched and the group's airplane that travels the farthest will win. If the group name cannot be read, the airplane is disqualified. If it is not in the shape of an airplane, the airplane is disqualified. If you remove your disability or cheat in any way in the launching or building of the airplane, your airplane is disqualified."

After the airplanes have been thrown and judging of the airplanes is over, proceed with classroom discussion. "When you walked in, did you get to choose your disability? No! You were randomly assigned a disability. People who have disabilities in real life do not get to choose either. Whether their disability is physical or mental, they would not have ever chosen to have their disability. So, why would you ever make fun of someone for having a disability that they did not choose? It is very important that we are always empathetic for people with disabilities. What does empathetic mean?"

Empathy is defined as "the capability to share and understand another's emotion and feelings. It is often characterized as the ability to" put oneself into another's shoes," or in some way experience what the other person is feeling. Empathy does not necessarily imply compassion, sympathy, or empathetic concern because this capacity can be present in context of compassionate or cruel behavior" (2009). Open for more class discussion throughout.
A key part of this activity is that students have to help each other. The teacher should ask, "Would you have been able to complete your airplanes without the help of your teammates?" The same is true in life. We must work as a team to be the most successful. Every individual brings a different strength to the table. Your strengths are most likely different than the strengths of others so if we all work together to utilize everyone's strengths, than we are all better off in the end.

Results

In past experience, students loved this activity and lesson. They seemed to understand the concept of empathy. It was interesting to see them come in and ask for a specific disability and complain when given one they didn't like or think was cool. Then at the end in discussion when we talked about how people with disabilities can't choose either, they really made the connection. The original idea for this lesson was induced by witnessing students making fun of a student with severe Attention Deficit Disorder and others in the school. The goal was to allow the students to have a day in the shoes of someone with a disability and really think about the implications of their cruel comments.

Advice to Others

This lesson works best with older students. It is a fun activity, but to really create the thought process necessary for the points to truly get across, it is recommended with high school aged students. Also make sure there are pre-determined groups before class starts to save time and avoid cliques.

Cost/Resources Needed

You will need blindfolds (bandanas work well), masking tape, string, white printer paper, and markers. This is a low cost activity but some investment is necessary.

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Using Expectancy Theory to Guide Peer Evaluation

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Need for Innovation

The National Research Agenda for Agricultural Education and Communication highlights the importance of exploring teaching practices and learning applications that contribute to student success in university and postsecondary settings (Osborne, n.d.). One area of consideration is the use of small group activities which has increased in recent years (Friedman, Cox, & Maher, 2008). However, if you ask students, many of them will share their dislike of group activities. Often, they are frustrated by the distribution of work within a group, and they complain about social loafing, or free riding, that occurs when all group members receive the same grade, regardless of input (Aggarwal & O'Brien, 2008; Brooks & Ammons, 2003). This is a frustration for the student who is completing a majority of the work and for the instructor who is trying to engage all students and reward them appropriately. Peer evaluation is an under-utilized technique that can improve student motivation and offer valid assessment, but it must be facilitated appropriately (Baker, 2008). Expectancy theory can guide the peer evaluation process by promoting incorporation of three key components: expectancy, instrumentality, and valence (Friedman, et al., 2008) (Figure 1.).

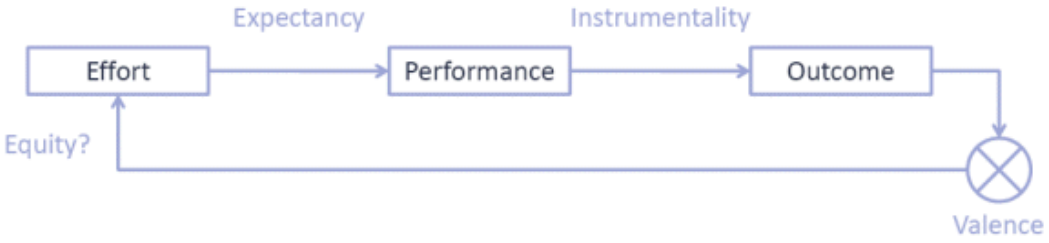

Figure 1. Expectancy theory diagram, based on work by Victor Vroom. Reprinted from Arrod Coaching, *Expectancy Theory of Motivation*. Copyright 2003-2006 by Dave Droar. Available at http://www.arrod.co.uk/archive/concept_vroom.php.

How it Works

Students must believe that individual effort will lead to acceptable performance (expectancy), performance will lead to specific outcomes (instrumentality), and the outcomes will be personally valued (valence). To incorporate these critical components, it is important to address each one separately.

1. **Valence**: Engage students in discussion about the purpose and potential outcomes of a quality peer evaluation process. A quality peer evaluation process will require additional time investment from students, so they need to see a connection to personal benefit. Specifically, the process needs to be framed as an opportunity for improved group dynamics and personal growth.
2. **Instrumentality**: Use an interim peer evaluation mid-way through the semester or project to serve as a check-point. Because this "practice" evaluation is formative, it can promote changes in performance that may be necessary to achieve desired outcomes. As a result, students see that the peer evaluation process has value far beyond a grade in the course.
3. **Expectancy**: Include multiple evaluation formats to best meet diverse learning styles. A single letter or numerical grade is insufficient. Peer evaluation assessments allow students to provide anonymous written comments and ratings, with the understanding that the feedback must be constructive. This allows students to better understand the connections between their effort and the performance ratings from their peers.

Results to date

To date, the authors have implemented this peer evaluation process with both undergraduate and graduate level courses. Feedback from students has been positive, with the majority of students recognizing connections between the peer evaluation process and an improved classroom and learning experience (Figure 2.). One student volunteered, "the peer evaluation is a way to try and get everyone to participate and reduce social loafing." Another student said, "it makes students want to work harder."

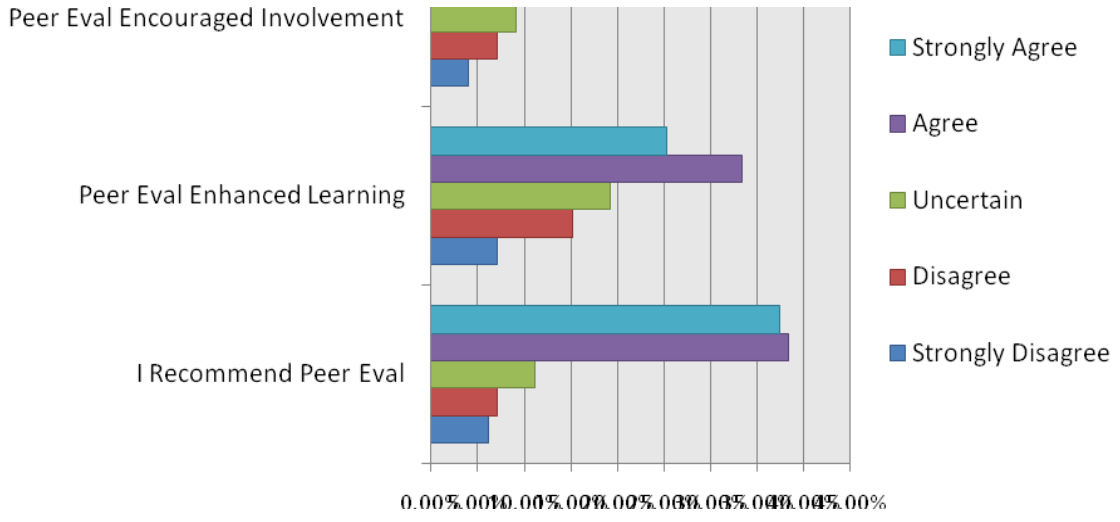

Figure 2. Student evaluation data related to the peer evaluation process (N=98).

Future Plans/Advice to Others

Grade inflation is a concern with peer evaluation, and the best defense against grade inflation is incorporation of objective criteria. The authors have been working with peer

evaluation rubrics that offer improved objectivity, but more needs to be done in that area. In some circumstances, the peer evaluation form will need to be tailored to fit the group assignment. As concluded by Friedman and colleagues (2008), peer assessment is a complex process that is in need of further study.

Costs/Resources Needed

As with most innovative ideas, the most significant investment is time and a commitment to the process. The instructor should expect a few hours of work preparing and summarizing the peer assessments. Financial costs associated with peer evaluation may include copies of the assessment forms and/or an electronic course delivery system for managing the distribution, submission, and reporting of the peer evaluations. In most circumstances, the additional direct costs of implementing a quality peer evaluation is less than $0.50 per student.

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Using Farm Tours to Enhance the Graduate Student Experience

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Introduction

Graduate student research in agricultural education and communication commonly focuses on areas such as farmer interest, enterprise diversity, sustainability, management of operations, and educational strategies for commodity groups and organizations. The 1990 farm bill calls for Cooperative Extension and educators to be trained in sustainability and related agricultural issues (Frances & Cater, 2001). Frances and Cater (2001) found that regional projects have been funded to enhance the capabilities of specialists and educators to deliver appropriate programs and provide accurate advice to state and local organizations and producers. Graduate students are in circumstances similar to extension agents. They are recognized as information providers, and stakeholder groups expect useful advice and relevant recommendations from graduate student research. For this reason, graduate students in agricultural education and communication need to be well-grounded in state and local agricultural issues.

Traditionally, land grant universities attract out-of-state and international graduate students to their programs. This level of diversity provides enriched thinking and problem-solving for issues concerning state and local agriculture. However, there is often a contextualization disconnect that must first be overcome before the graduate student can begin providing sound advice based on their research regarding topics unique to the state. Because of this need, an annual farm tour was developed by the graduate student association within the department. The farm tours supply students with authentic experiences in areas of agriculture that are unique to the state or region. Students then have the contextualization of local agriculture that is uniquely different from their prior experiences and increases student conceptual understanding (Myers & Jones, 2004).

How It Works

The farm tours are designed to provide an appreciation of the agricultural and natural resources industry within the state for graduate students. This state has a largely diversified agricultural industry due to the distinct geographical regions. Furthermore, this department has a developed a strong relationship with many industry representatives through its direct connection with the state's agricultural and natural resources leadership development program for adults. Each year, one to two graduate students have taken on the leadership role of organizing the farm tour. The students contact graduates of the agricultural leadership program within different sectors of the agriculture industry to set up on-site visits. The agricultural commodities are selected based on the discussions and needs of the current graduate students within the department. Other criteria are based on leading commodities within the state, crop seasonality, and the location in relation to the university. These on-site visits typically involve a brief discussion about the commodity or organization and a tour of the facilities or fields. The farm tours are typically held on Saturdays and involve a full day of programming.

Costs

Travel is the costly part of the farm tours. By only spending one full day, no hotel costs are incurred. The individuals within industry have been generous and donated meals. In addition, the department has paid for approximately half the cost of fuel. Attendees spend about $25–30 for the entire farm tour trip. The costs of the farm tour are considerably low given the travel involved and the knowledge gained by the graduate students.

Results to Date

The farm tours began in 2007. To date, three tours have been conducted in three different regions of the state, offering students an in-depth look into ten different agricultural commodities. In 2007, the group visited a cow-calf operation with extensive marketing plans, a large, innovative dairy operation, and a small horse farm in the north-central region. The following year, attendees toured one of the largest strawberry and blueberry marketing organizations in the country, a large tree nursery, and a cow-calf operation in the central region of the state. This year, the students traveled to the south-central region to tour the citrus, ornamental horticulture, hydroponic strawberry, and alligator sectors. An average of 10–15 graduate students attended the annual tour each year with out-of-state students making up a majority of the attendees.

The graduate students were asked for their feedback on the farm tours and provided informal qualitative responses. The dominant theme of the responses revealed benefits to students' graduate educational experience. They were able to network with people in the industry and develop a contextualization of the breadth of agricultural commodities and production practices. Students with an agricultural background from their home state or country enjoyed comparing and contrasting their previous knowledge to the new experiences. Other statements included:

"As an agricultural educator, I enjoy finding practical examples of agricultural practices that I can relate to my future students."

"When you think of [this state], you see [big cities, tourist hot spots,] and beaches, but that is not all of it —not even a majority of the land use. Most of the activities we did on the farm tour, I would have never got to experience on my own living [here]."

"This was the first agriculture tour I ever took in the U.S. [It was] was an eye opener in that it gave me a perspective of the industry in action, the issues, and the processes. It helps people whose focus may not necessarily be on agriculture, but rather on other areas such as natural resources, bring the two together and make sense of the perspectives and challenges for each."

Advice to Others

Graduate students relocating far from home or those less familiar with agriculture found these state tours beneficial to their graduate student experience, teaching, and ultimately, their careers. Those native to the state were also able to learn about other sectors in the industry they were not familiar with and echoed similar benefits. In short, other land grant institutions should consider organizing tours of the state's agriculture to enhance the graduate students' learning experience and instill an appreciation and understanding of the diversity in companies, production, and commodities.

Future Plans

The blue print to carry out the farm tour at this land grant has been set forth in its graduate student organization. In 2010, the group plans to tour operations in the southern part of the state where unique crops are grown and contentious urban/rural issues arise over natural resources. Continuing the farm tours will provide the opportunity for graduate students to incorporate these new experiences in agriculture into their education, teaching, and career plans.

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Using Interactive Whiteboards in the Agricultural Education Classroom: How Student Teachers are Using this Technology—Possible Implications for Teacher Educators

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Introduction and Background

"Interactive whiteboards (IWBs) are becoming increasingly popular in educational environments" (Haldane, 2007, p. 257). IWBs are large, touch sensitive screens linked to a classroom computer, which allow teachers to access still and moving images with sound and provide a multi-modal portal to address the needs of whole classes, groups, and individual learners (Lewin, Somekh, & Steadman, 2008). IWBs promote pupil interest, more sustained concentration, and more effective learning when teachers know how to use the technology to support a variety of learning styles (Glover & Miller, 2001a, b, c, 2002, 2003 as cited in Glover, Miller, Averis, & Door, 2007). Thus, educators need to design lessons that connect students and the instructor to provide opportunities for learning through multi-media (Nelson & Thompson,

2005). Because teachers often teach as they were taught (Nelson & Thompson), it is imperative that use of IWBs in teaching methods courses for pre-service AGED students is facilitated. Kotrlik, Redmann, and Douglas (2003) stated, "Even though numerous studies have been conducted about how agriscience teachers use technology, no research has been conducted to determine how these teachers are integrating technology in the teaching/learning process" (p. 82). Although most agriscience teachers actively explore and adopt technology for regular use in instruction, there is limited active experimentation and advanced integration of technology in instruction (Kotrlik et al.). Because little research has been done describing how U.S. teachers are using IWBs generally, or in the AGED classroom specifically, more should be understood about AGED teachers' use of IWBs, including pre-service AGED teachers.

How It Works

In their teaching methods course, pre-service teachers were introduced to the concept of IWBs, specifically, SMART™ technologies (i.e., SMART Technologies, 2009). The introduction of this technology was to encourage their using it in lesson preparation and in the high school AGED classroom during student teaching. An IWB distributor provided a comprehensive demonstration to the students, which included general usage, applications, hardware, and related software (i.e., SMART™ Notebook SE bracelets). Thereafter, student teachers created lessons incorporating their use of these technologies. Opportunities were then provided to student teachers to present lessons and receive feedback about their lesson presentations, including use of the IWB to enhance instruction. Following the four-week, on-campus courses, student teachers entered their 12-week student teaching experience with SMART™ Notebook SE bracelets. The bracelets allow mobility for instructors and students alike to access the Notebook SE software from any computer to construct and deliver lessons. Student teachers are required to complete weekly reports to document their use of the IWBs, including use of the software bracelets. Data from their reports are being collected to assess how they are using IWBs.

Results to Date

Nine of the 11 student teachers have access to an IWB, and seven of the nine are using the technology. From data collected, student teachers reported using IWBs to teach lessons on Animal Science, Plant Science, Agricultural Power & Technology, Introduction to Agriscience, 8th Grade Agricultural Explorations, Natural Resources, and Horticulture. Additionally, the student teachers reported using the IWB to deliver content using PowerPoint®, playing games such as Jeopardy and baseball to review lesson content, and interactively identifying livestock anatomy and breeds of livestock. Student teachers are also journaling, i.e., writing narrative comments, about their experiences with the IWBs.

Future Plans and Cost/Resources Needed

AGED faculty will continue to collect data for the remainder of the fall 2009 student teaching semester, and discuss student teachers' use of the IWB when conducting observations at the student teaching centers. At conclusion of student teaching, the students will participate in a focus group interview during their capstone seminar debriefing. During the interview, their use of IWBs, in lesson preparation and teaching, will be probed more deeply to better inform faculty about future preparation needs to ensure effective use of IWBs, and what may be opportunities for more systematic inquiry. It is also anticipated that cooperating teachers' use of IWBs will be studied in the future, including the impact of student teachers on cooperators' adoption and use of this innovative instructional tool.

Item	**Cost Range**	**Average Cost**
Interactive Whiteboard	$1,200 - $3,000	$2,100
LCD Projector	$750 - $3,000	$1,875
PC or MAC Computer	$750 - $4,000	$2,375
Software (i.e., SMART™ SE Notebook Bracelets)	$49 - $55	$52
TOTAL	**$2,749 - $10,055**	**$6,402**

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Using Q-methodology to Measure Student Teacher Perceptions while Interning: Implications for Formative Assessment

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Introduction/Need for the Idea

Traditionally, when a university supervisor makes a sight visit to evaluate a student teacher, it consists of a formal observation and assessment. Providing feedback to student teachers during the course of the internship is important because it "is one of the more instructionally powerful and least understood features in instructional design" (Cohen, 1985, p. 33). Perhaps one of the least understood methods of providing effective feedback is formative assessment. "Formative assessment is that process of appraising, judging, or evaluating students' work or performance and using this to shape and improve their competence" (Tunstall & Gipps, 1996, p. 389). Shute (2008) defined formative feedback as "information communicated to the learner that is intended to modify his or her thinking or behavior for the purpose of improving learning" (p. 154).

A possible method for delivering effective formative feedback is through Q-methodology. Q-methodology is a research method used to systematically study human subjectivity to better understand a person's viewpoint or beliefs on a chosen topic (Brown, 1993; McKeown & Thomas, 1988). It differs from R-methodology in that R describes a population of people while Q describes the views of those people (van Exel & de Graaf, 2005). Being able to capture the views of student teachers can allow for an additional dimension of evaluation and communication between the student teacher and the university supervisor.

How It Works/Methodology

When implementing the Q-method to capture student perceptions, students are asked to perform a Q-sort. The end product of a Q-sort is the student's rank ordering of a list of statements about a certain phenomenon (i.e., teaching ability). The students rank order the statements in response to the prompt, "How do you feel about the courses you instruct?" Each statement is individually written on a card. To begin the rank order process (sorting), students

read each statement and placed the card into the Q-sort Form Board. The board is a distribution chart with nine columns, ranging from a value of -4 to +4 (Figure 1). The top two statements in which students perceive to be most like them are placed in the +4 column while the bottom two statements most unlike them are placed in the -4 column. The process is repeated working toward the middle column (0), which represents neutral statements.

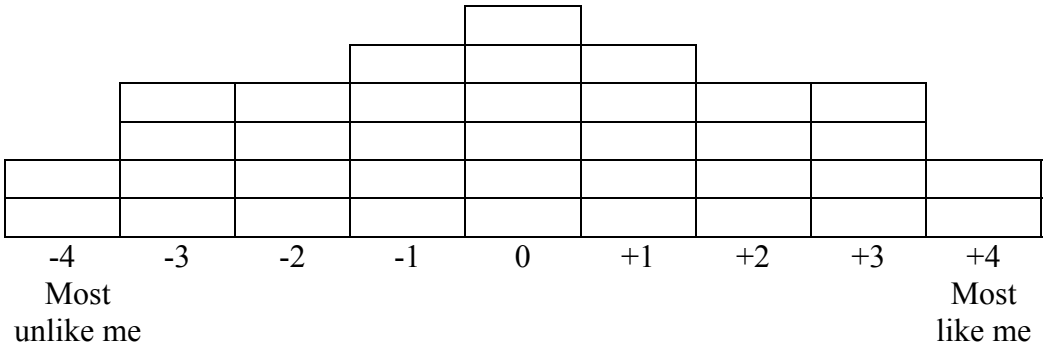

Figure 1. Q-sort Form Board

Each of the student teachers' Q-sorts are then factor analyzed using PQ Method software to develop a correlation matrix. Specifically, each individual Q-sort is correlated with all other Q-sorts to determine levels of agreement or disagreement on their ability to perform teacher tasks. Each factor is determined by evaluating the eigenvalues for each statement. A varimax rotation with a .45 significance level is then used to determine specifically which student teachers highly correlated with each other and which did not.

Results to Date

The Q-sort Foam Board was designed and implemented with spring 2008 student teachers to acquire summative feedback during weeks 8-12. Specifically, a three factor solution was extracted from the student teachers' Q-sorts. Each factor was interpreted by the researcher to illuminate the viewpoints of student teachers' self-efficacy of their classroom and laboratory teaching ability. The results were categorized into three themes: *Emerging Teacher*, the *Self Assured*, and the *Humble High Achiever*. However, assessing these students formatively, prior to student teacher observations, could add benefit to student teacher visits by university supervisors.

Implications

"The central purpose of formative assessment is to contribute to student learning through the provision of information about performance" (Yorke, 2003). Using the Q-sort Foam Board will allow teacher educators to have a better understanding of student teacher needs prior to visiting the cooperating center. As such, opportunities exist for providing more structured and focused feedback to student teachers on areas in which they believe they are most inadequate and limited.

Costs/Resources Needed

The Q-method costs little to implement. The statements which student teachers rank may be printed onto cardstock ($0.25 per sheet) or uploaded to the internet for online delivery (~$30.00 per month via SurveyMonkey). The Q-sort Foam Board consists of printing the distribution chart onto paper and gluing the paper to a piece of poster foam board ($1.00 per sheet). The Q-sort Foam Board may be used repetitively as each student teacher's sort may be recorded onto a separate sheet of paper. The PQ Method software, used to analyze data, is available for free download. Additional free software, (i.e., FlashQ), may be a means for performing Q-sorts online, eliminating any above costs.

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Utilizing Industry Experts To Provide Enhanced Agricultural Mechanics Skills to Secondary Instructors

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Introduction

For one week each July, in-service teachers and pre-service teachers enroll in the AED 687 course at State University. The students spent Monday through Friday, 8:00 AM to 5:00 PM, developing skills and broadening their experience in agricultural mechanics. The need for this course was identified when the course instructor evaluated the agricultural mechanics courses being completed by agricultural education students at both the undergraduate and graduate level.

Program Structure

The week long course followed the format utilized by Laboube, Burris, & Kitchel (2004) which emphasized developing agricultural mechanics skills and management techniques. The course focused on a wide range of agricultural mechanics topics including: welding, small engines, global positioning systems (GPS) and rocketry in agriculture. Instruction was conducted by a member of the National Agricultural Mechanics Career Development Committee, and by professionals in the industry that provided the equipment and expertise in their respective fields for the students to develop hands-on skills.

Major agricultural mechanics companies in the past have provided representatives from their training department to deliver up-to date technical content in their respective fields. Some examples included Briggs and Stratton who provided small engines and all of the tools necessary to disassemble and reassemble overhead valve small engines along with curriculum and teaching aids. Lincoln Electric has provided consumable materials along with curriculum and other teaching aids to teach multiple welding processes. ESAB provided Oxy-Acetylene and Oxy-propylene regulators, torches and tips along with ready to use curriculum in both areas. Milwaukee tools provided a representative who covered the entire line of Milwaukee products including tools that have not reached the market yet. The rep also demonstrated safety and proper use of each tool before the students were able to use the tools.

An example of the typical course began with day one including instruction on safety issues and the students participated in a simulated agricultural mechanics career development event to assess student knowledge in agricultural mechanics utilizing themes that would be covered that week. In the afternoon, the class participated in a simulated team activity that asked the students to develop a bill of materials and procedure sheet for a project to be constructed on day two. Day two focused on the safe use and maintenance of wood working equipment in the morning and building the project from the team activity on day one in the afternoon. Day three focused on GPS and rockets in agriculture, and day four focused on Mig and Tig welding along with equipment set-up and management. On day five, students disassembled and reassembled small gas engines and received curriculum training as well. An hour of class on days 3-5 were devoted to exploring and discussing research topics in agricultural mechanics related to secondary education. The students were divided into groups to review research in agricultural

mechanics and discuss the findings and implications with the class. For an example of a complete outline of the week utilized in the past see Table 1.

Table 1
Example Schedule of Activities

Monday	Tuesday	Wednesday	Thursday	Friday
1. Orientation to the week 2.Laboratory safety 3.Introduction to the Agricultural Mechanics CDE	1. Safe use of woodworking equipment 2. Maintenance of woodworking equipment 3. Woodworking project construction	1.Global positioning systems 2.Rockets in Ag 3.Individual skill development 4.Woodworking project construction 5.Agricultural mechanics research	1. MIG welding 2. TIG welding 3. Individual skill development 4. Agricultural mechanics research	1.Small engine disassembly 2.Small engine reassembly 3.Agricultural mechanics research

Results to Date

The results of this course reinforced the findings from Laboube et al. with the confidence level among the students improving significantly over the course of the week. Several students noted that they would integrate several of the topics into their curriculum that they would not have taught prior to taking the course. Informal evaluations indicated that all of the students would enroll in the course when offered again and would highly recommend the course to other teachers. The university has also been able to strengthen their ties with the companies that have assisted with instruction in the past. Several representatives have assisted in acquiring equipment for the department to enhance instruction. In the past three years the teachers have been able to take home over $35,000 in equipment, tools and other teaching materials to utilize in their classrooms.

Future Plans

The instructor has been in contact with additional corporations to provide training using their instructors and provide their equipment. It is also the intent of the instructor to rotate topics on a yearly basis while also utilizing multiple agricultural mechanics themes with in each course. The instructor has also been in contact with other post-secondary institutions to serve as a host for agricultural education students interested in participating in the class that are enrolled at other institutions.

Resources Needed

It is recommended that the host institution provide an agricultural mechanics laboratory or similar facility with proper electrical outlets and ventilation necessary for the presenters needs.

The corporations that have agreed to participate have provided state of the art equipment, tools, consumable products needed to conduct the lessons and have also provided all of the participants with curriculum and numerous other teaching aids.

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Agricultural and Natural Resource CTE Programs and Science Achievement: How Does It Compare with Other CTE Programs?

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Career and Technical Education programs include over 9.2 of the nation's 14.9 million secondary students. These programs aim to develop competencies to prepare individuals for further education and careers in agricultural and natural resources, business, communications, and other related industries. Specifically, STEM and health CTE programs have been recognized as contributing to students' achievement in science. However, previous studies have suggested CTE teachers focusing in agricultural and natural resources believe integrating science into their curriculum has aided their students in making connections between agricultural topics and math and science principles. Therefore, this programmatic area is expected to complement the science academic core. This study has been developed to compare 11th grade FCAT science achievement scores of those students enrolled in an agricultural and natural resources cluster with those enrolled in STEM and health clusters. The data analysis revealed that students in agriculture programs scored slightly lower on the FCAT science test than those in health programs and somewhat lower than those in STEM programs. On the other hand, concentrators in agriculture programs scored on par with those in health programs and slightly lower than those in STEM programs after controlling for student and school factors.

Introduction

It is widely believed that the prosperity of the nation's people and economy rests, in large part, on the availability of human capital. Since most human capital is generated through formal education, the quality of public K-20 education becomes of paramount importance in preparing America's youth to be productive professionals. Furthermore, the need for skilled professionals in science-oriented jobs is increasing in the technology-driven global economy, and policymakers are concerned that the supply of skilled workers will fall short of demand. This concern is based in part on the lower levels of achievement of high school students on standardized science tests relative to peers in other OECD countries (U.S. Department of Education, 2008a:29).

Career and Technical Education (CTE) programs involve over 9.2 million of the nation's 14.9 million secondary students and constitute an important part of the nation's education system (U.S. Department of Education, 2007; 2008b). CTE programs are intended to develop competencies to prepare individuals for further education and careers in agricultural and natural resources, health, technology, and other related industries.

One approach to strengthening education and, in particular CTE programs, is through the integration of science and other academic content across the curriculum. The latest of these

efforts is through the Carl D. Perkins Career and Technical Education Improvement Act of 2006. The No Child Left Behind (NCLB) mandate to measure student achievement in science (U.S. Department of Education, 2006), coupled with the Perkins legislation indicates the imperative nature of expectations that CTE teachers join their education colleagues in preparing students to meet science achievement standards.

It has been argued that integration of science in real-world settings and with real-life experiences is essential simply as a means of effective practice (Maurer, 2000). The American Association for the Advancement of Sciences has advocated that effective instruction in science starts with questions about nature, engages students in real-world settings, and stresses active learning strategies (Rutherford & Ahlgren, 1990). Previous studies suggest CTE teachers believe integrating science in the CTE curriculum has aided their students in making connections between science principles and agriculture (Enderlin & Osborne, 1992; Myers & Washburn, 2008; Thompson, 1998). It has also been reported that students who participated in CTE courses performed as well as their counterparts on standardized achievement exams measuring achievement in science (Connors & Elliot, 1995), or better than their counterparts who did not complete instruction in CTE (Chiasson & Burnett, 2001)

Integration of academics into the CTE curriculum can be an effective way to teach science. Several studies show that students taught by integrating CTE and scientific principles had higher achievement than students taught by traditional approaches (Chiasson & Burnett, 2001; Enderlin & Osborne, 1992; Myers & Dyer, 2006; Roegge & Russell, 1990; Whent & Leising, 1998). Few large-scale, systematic studies have, however, examined how well CTE students are prepared to compete for science-oriented positions in college and industry (Crain et al., 1999; Plank, 2001; U.S. Department of Education, 2004). Little is known about the differential influence of specific curricula on students' performance. In order for CTE programs to maximize student outcomes in science, there is a need to identify attributes that result in higher achievement. This study begins to address this need by exploring the level of involvement of students in CTE programs and compares their performance on standardized science tests. In addition, the performance of students is compared across three clusters of CTE programs: agriculture, health, and science, technology, engineering and mathematics (STEM).

Conceptual Framework

This study is part of a larger research program that is guided by an ecological model to holistically explore math and science achievement. The ecological approach recognizes the influence of student background, as well as the role that families and communities play as mediators and moderators of educational processes and structure. In short, students are nested within families and schools and these, in turn, are nested in communities. A conceptual model (Figure 1) illustrates the multi-level influences of educational processes and student outcomes. Factors used in this study are described in more detail below.

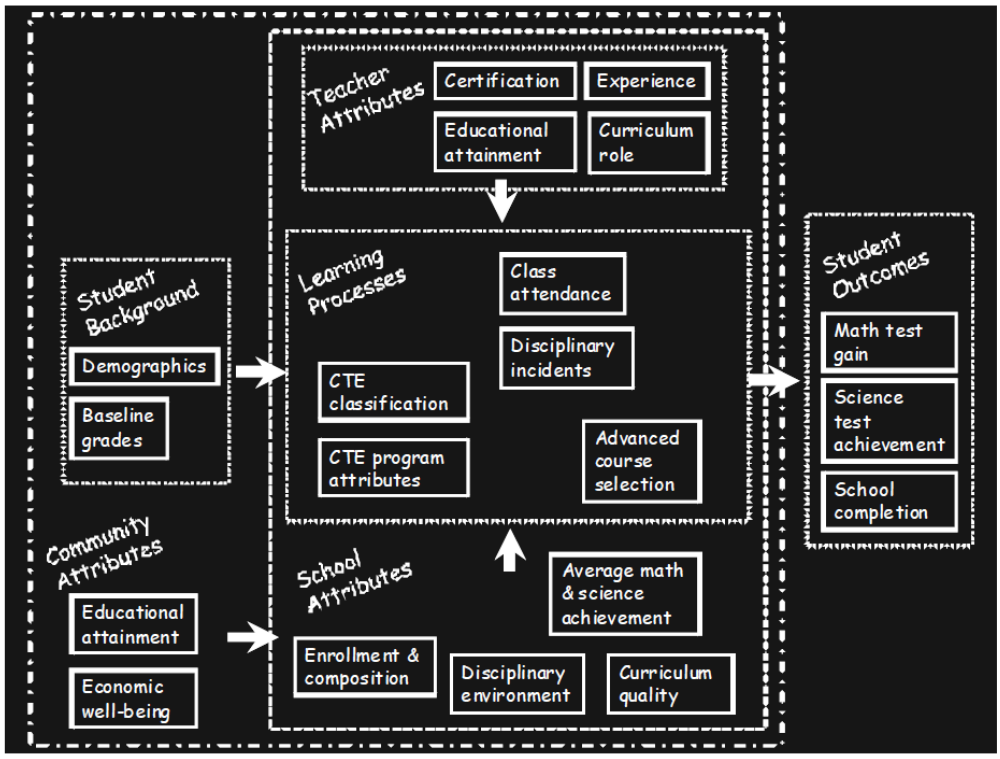

Figure 1. Conceptual model of nested factors affecting student outcomes in math and science

Involvement in Career and Technical Education Programs

Though the total number of CTE courses taken by students has been relatively stable (U.S. Department of Education, 2004), there is considerable variability in CTE programs. Based on enrollment in specific courses, students can be classified as occupational concentrators, occupational explorers, and coursetakers (see U.S. Department of Education, 2004; Levesque, 2003). Students also can be classified to identify those taking a college preparatory curriculum and evidence suggests the more rigorous coursework benefits these students on standardized tests and grade point average (Plank, 2001).

Student Attributes that Impact Learning

Over three decades ago, Duncan, Featherman and Duncan (1972) noted that certain statuses, including race, ethnicity, and gender, affect the life chances of individuals. According to Coleman (1988), these factors constitute the disadvantages of background. More recently, Flora, Flora and Fey (2004) suggested that legacies of gender, race, and ethnicity continue to shape the educational aspirations that parents have for their children, or the expectations that teachers have for their students. Downey, von Hippel and Broh (2004) found evidence, however, that schools prevent gaps between advantaged and disadvantaged groups (with the exception of the Black/White gap) from increasing.

Students also vary according to innate ability. Gifted students, for example, are better positioned to enroll in higher-level courses (e.g., advanced science courses) that have important bearing on achievement. Conversely, students who have been retained or receive special

education services face greater challenges to attain a high achievement level during their educational career (Alexander et al., 1997).

School Attributes that Impact Learning

Structural components of schools that can impact outcomes include the socioeconomic background of the student population, the number of students enrolled in the school, and the nature of the learning climate in the school or classroom. Students attending schools in which the enrollment is drawn primarily from high socioeconomic status families and who interact with high-status peers have higher achievement on average, in part because students attending higher SES schools are more likely to establish friendships with individuals having good learning skills and high educational aspirations (Blau, 1994; Coleman et al., 1966; Stockard & Mayberry, 1992). At the same time, higher status schools are likely to have well-articulated norms and values that encourage good academic performance and limit problem behaviors (Alexander & Eckland, 1975; Friedkin & Neocochea, 1988; Hoffer et al., 1987; Rutter et al., 1979).

School size is commonly linked to student achievement. To some researchers, larger schools promote higher achievement since they can offer students a richer set of course offerings (i.e., a better opportunity to learn), have better trained and qualified teachers, and have a more diverse set of educational support services (Ballou & Podgursky, 1998; Greenberg & Teixeira, 1998). Others argue that smaller schools are better academically because of lower student-teacher ratios, greater attention by teachers to the needs of students, higher participation in school activities, and the lower absenteeism (Greenwald, Hedges, & Laine, 1996; Gregory & Smith, 1987; Lee & Smith, 1996; Walberg & Fowler, 1987).

The level of monetary resources also can have an impact on the learning environment and educational achievement (Greenwald et al., 1996; Mortimore et al., 1988; Wenglinsky, 1997). Resources affect the quality of school buildings, equipment for classrooms, books and other instructional resources, as well as teacher salaries (Stockard & Mayberry, 1992; Turner, Camilli, Kroc & Hoover, 1986). While some studies show little relationship between expenditures and achievement, the linkage is more apparent when resources are focused on specific programs (Arum, 1998).

Methods

Administrative records contained in Florida Department of Education's (FDOE) data warehouse was used for the study. This includes student demographics, courses, awards, and standardized test scores, as well as school-level data (e.g., Florida School Indicators Report data). Student demographics (e.g., gender, race-ethnicity, age) were necessary as statistical controls. Course data were needed to identify students in CTE programs and measure the intensity and type of participation in CTE programs, while test data were measures of outcomes. The school-level data were important to control for the school context and learning environment.

To assess student achievement in CTE programs, a cohort of approximately 80,000 students enrolled in 10th grade CTE programs in 2003-2004 was selected for the study. Note: 2003-2004 was selected because course enrollment and transcript data were available through the

senior year. From this cohort, we selected the students who had earned credits in one of three CTE programs (i.e., agriculture, health science, STEM) *and* had an available FCAT science test score. Because some eligible students were likely to have been absent on the day(s) that the science test was administered and the authors also wished to generalized to results to other cohorts of students, the available data represents a sample of the population of interest. Thus, tests of significance are applied during the data analysis.

Dependent Variable

The science FCAT was administered to students in grade 11 during the month of March 2005 (Florida Department of Education, 2005). The science test used multiple choice, gridded response, and performance task items. These tests have a criterion-referenced version (FCAT SSS), which measures students progress toward meeting the Sunshine State Standards in the respective content area (Florida Department of Education, 2005; 2007). The validity of these tests rests, in part, on the rigor in aligning the test items with the Sunshine State Standards benchmarks (Linn, 2001; Schoenfeld, 2006). The FCAT science test score is based on a combination of Item Response Theory (IRT) measurement models (Harcourt Assessment, Inc., 2006). According to Harcourt Assessment, Inc. (2006:50), "the unidimensional IRT model provides a very reasonable solution for capturing the essence of student achievement" and acceptable reliabilities (>.845) have been reported for math FCAT test. The IRT scores are transformed into the FCAT scale, which ranges from 100 to 500.

Independent Variables

The independent variables, which measure attributes of CTE programs, are: 1) Curriculum investment (a categorical variable comprised of occupational concentrators, occupational explorers, and coursetakers), and 2) College preparatory coursework (a binary variable to indicate that a student has included courses in a foreign language and advanced mathematics that are required for the college preparatory curriculum). CTE classification is based on the student transcript data and is used to identify concentrators, explorers, and coursetakers (see Department of Education, 2004; Levesque, 2003). The classification uses standardized course numbers that a student has taken. For example, students who have enrolled in the agricultural and natural resources occupational cluster will have taken course numbered in the 8100000s. Concentrators are defined as having 3 or more credits for coursework in a single occupational program, while explorers have 3 or more credits in multiple occupational concentrations.

Moderator and Mediator Variables

Based on the conceptual framework outlined earlier, a number of potential moderator and mediator variables were included. Student background variables included gender, race-ethnicity, special status categories (e.g., gifted), eligibility for free and reduced-price lunches (used as a proxy for SES), age, and home language.

School-level attributes included enrollment size and composition (e.g., percent of gifted students, percent of students eligible for free and reduced-priced lunch). The disciplinary

environment included measures of disciplinary actions (e.g., in- and out-of-school suspensions, expulsions). Data on disciplinary actions were based on administrative records that were reported through the School Environmental Safety Incident Reporting (SESIR) System and maintained in FDOE's data warehouse. Other environmental measures included the absentee rate for the school, as measured by the percent of students who are absent 21 days or more during the school year, as well as FDOE's calculated graduation and stability rates, but measures of teacher quality and experience were not yet incorporated into the data set. High levels of absenteeism might reflect a milieu of low engagement (cf. Alexander et al., 1997). Other school-level attributes included curriculum quality and average math and science achievement. Average science achievement was measured as school mean score on the FCAT test. Finally, the school's location was included. A number of studies have shown that rural location is associated with lower levels of resources as well as lower student outcomes (Israel et al., 2001; Reeves & Byland, 2005; Roscigno & Crowley, 2001). Rurality categories were based on NCES's urban-centric locale codes (National Center for Education Statistics, n.d.).

Data Analysis

The initial analyses explored distributions of the data. This was followed by examining bivariate associations, fitting exploratory OLS regression models, and the final HLM models for students in three CTE programs: agriculture, health sciences, and STEM.

Procedures for Analyzing Curriculum Patterns and Classifying CTE and non-CTE students

FDOE's data on Student High School Transcripts and Student Course Enrollment facets were used for classifying CTE students. SAS software was used to search the transcript data for matches with requirements of a specific CTE program in order to classify students as occupational concentrators, explorers, or coursetakers. The following illustrates an analysis of one student's transcript:

Course	Credits	Category
Life Management Skills	.5	CTE
Illustrative Design Technology 1, 2, & 3	3.0	CTE
English Honors 1 & 2, AP English Language, Composition (2)	4.0	English
Mathematical Analysis, Geometry Honors, Algebra 2 Honors, Pre-calculus, Calculus	5.0	Math
Biology 1 Honors, Chemistry 1 Honors, Physics 1 Honors	3.0	Science
World History Honors, American History Honors, AP United States History, Economics Honors, American Government Honors, AP Psychology	5.0	Social Science
German 1 & 2	2.0	Foreign language

The above student completed a sequence of courses comprising 3 credits in an occupational program, Drafting/Illustrative Design Technology, within the Science, Technology, Engineering and Math (STEM) cluster, and thus can be classified as an occupational concentrator. The student also had .5 credits for Life Management Skills, which is required for

the standard program of every student. In addition, the student has 4 credits in English, 5 in Math, 3 in Science, 5 in Social Studies, and 2 in a foreign language, which indicated a college preparatory curriculum and a status of dual concentrator.

Procedures for Multi-level Analysis of Science Test Scores

For science, two-level HLM cross-sectional models were used to analyze the standardized test scores (Raudenbush & Bryk, 2002; Singer, 1998). The mixed models procedure in SAS was used to account for the nested data structure (students within schools and communities). The first level measures differences between students within schools, and the second level measures difference between schools/communities. The level one model is:

$$\text{Science}_{ij} = \pi_{0j} + \boldsymbol{\pi}_{1j}(\text{student-level variables, including CTE attributes}) + e_{ij},$$

where Science_{ij} is the achievement level for student *i* in the school/community *j*, $\boldsymbol{\pi}_{1j}$ is a vector of the fixed effects for students in the school/community *j*, and e_{ij} is the error for student *i* in the school/community *j*. The errors were assumed to be normally distributed, conditional on student.

The level two models are:

$$\pi_{0j} = \beta_{00} + \boldsymbol{\beta}_{0j}(\text{school- and community-level variables}) + r_{0j}$$

$$\pi_{1j} = \beta_{10} + \boldsymbol{\beta}_{1j}(\text{school- and community-level variables}) + r_{1j}$$

where r_{0j} and r_{1j} are school/community-level random intercepts, respectively, which are bivariate normally distributed with an unstructured covariance. Note: $\boldsymbol{\beta}_{0j}$ and $\boldsymbol{\beta}_{1j}$ represent a vector of fixed effects parameters for the set of school- and community-level variables. All interval level predictors will be either group-mean or grand-mean centered, depending on the specific effect to be estimated (see Singer & Willett, 2003).

Findings

The distributions of the variables used in the analysis are reported in Table 1. In 2005, the number of students who earned credit in agriculture programs and took the FCAT science test was 6,650 and these students averaged 296.2 on the science test. This was slightly lower that students in health sciences programs and somewhat lower than those in STEM programs. There were proportionately fewer coursetakers in the agriculture (9.4%) than in the health sciences and STEM programs, respectively (32.0% and 21.5%). On average a smaller percentage of agriculture students completed college preparatory coursework during high school than did students in the other two CTE programs.

As shown in the section on student attributes in Table 1, CTE students with agriculture coursework also were comprised proportionately more of white, non-Hispanic students and English speakers than students in health sciences and STEM. Health science students were more likely to be female and STEM students more likely to be male than were students in the agriculture programs. Agriculture students attended 291 schools and these were somewhat

smaller high schools or schools that were located in towns or rural areas. Except for the percent of students who were enrolled in the free or reduced price lunch program, the other attributes of schools did not differ much between the types of CTE programs. Schools with students enrolled in agriculture programs had a higher percentage qualifying for the free or reduced price lunch program.

Table 1.
Distribution of curriculum, student and school attributes for FCAT Science test takers.

	Agriculture (n = 6,650)	Health (n = 8,737)	STEM (n = 13,213)
2005 FCAT Science score (0)	296.2	299.8	309.8
Curriculum attributes			
CTE involvement (%):			
Coursetaker	9.4	32.0	21.5
Explorer	59.9	33.9	61.4
Concentrator	30.7	34.1	21.5
College preparation coursework (%)	23.3	32.0	31.8
Student attributes			
Age (months) (0)	201.2	200.5	200.7
Male (%)	53.0	25.0	75.7
Race-ethnicity (%):			
White, non-Hispanic	73.5	46.4	58.4
Black, non-Hispanic	12.2	27.2	16.1
Hispanic	10.2	19.2	19.4
Asian, Pacific Islander	1.2	4.1	3.2
Other	2.9	3.2	2.9
Primary language spoken (%):			
English	92.5	80.9	82.7
Spanish	6.0	12.6	13.1
Other	1.5	6.6	4.2
Gifted (%)	1.1	1.0	1.2
School attributes	(n = 291)	(n = 380)	(n = 384)
Mean school FCAT Science score (0)	289.3	288.1	292.0
School enrollment (0)	1,664	1,794	1,799
Per pupil expenditures for CTE (0)	$5,097	$4,874	$4,872
Percent Gifted (0)	2.9	3.1	3.4
Percent free and reduced price lunch (0)	8.2	4.9	4.5
Percent absent 21 or more days (0)	15.0	15.0	14.1
Graduation rate (0)	70.6	68.4	68.6
Stability rate (0)	90.7	89.9	90.1
Percent In-school suspensions (0)	15.6	15.0	14.6
Out-of-school suspensions (0)	12.4	12.7	12.1
School location (%):			
Large city (>250,000)	2.5	4.3	4.2

Mid-sized city (<250,000)	6.3	6.4	6.6
Urban fringe of a large city	32.8	39.8	40.1
Urban fringe of a mid-sized city	36.6	36.6	37.5
Town	4.6	2.9	2.9
Rural, outside CBSA	14.4	7.5	6.6
Rural, inside CBSA	2.8	2.4	2.1

There were important differences in students' performance on the FCAT science test by their level of involvement in a CTE program. Among agriculture students, coursetakers scored considerably lower than explorers and even lower than concentrators (Table 2). A similar pattern was evident for STEM students. In contrast, health science coursetakers and explorers performed equally well on the science test and both were lower than concentrators. In general, agriculture students scored lower than their peers in health science and STEM programs at each level of involvement.

Table 2.
Mean 2005 FCAT Science score by cluster and CTE involvement.

	Agriculture	Health	STEM
CTE involvement:			
Coursetaker	282.7	296.6	303.9
Explorer	294.7	296.1	307.2
Concentrator	303.4	306.7	321.6
All CTE students in program	296.2	299.8	309.8

Next, CTE involvement was examined using hierarchal linear models to control for the effects of student and school factors. As shown by the variance components of the null models in the bottom section of Table 3, most of the variation in test scores occured within schools rather than between schools. For agriculture programs, 91.7% of the variance was between students within their school (i.e., 2453.8/(220.1+2453.8) and 8.3% is between schools. The between schools variance was slightly larger for health science and STEM programs (11.9% and 13.9%, respectively).

Given the distribution of the variance components, it is no surprise that all of the student-level curriculum and demographic attributes were significant factors in the regression models for agriculture, health science, and STEM programs. Though concentrators had higher science scores than explorers and coursetakers in all three programs, the advantage for concentrators in agriculture programs was the smallest (4.8 points, Table 3). On the other hand, concentrators in agriculture score on par with those in health and only slightly less than STEM concentrators (based on the estimates for the intercept and concentrator category when all other factors are set to their mean). In addition, students who took college preparatory coursework scored considerably higher (e.g., 30.5 points for agriculture students) on the science test than those who did not.

Consistent with many previous studies, male students in all three programs had higher test scores than female students. Students who were 214 months or older (which indicates that

they had been retained during their educational career) had significantly lower scores. Black students scored much lower on the FCAT science test than other students; Hispanic students in health science and STEM program had somewhat lower science test scores than White students. Hispanic students performed on par with white students in agriculture programs. On the other hand, students whose primary language was Spanish scored significantly lower on the science test. This suggests that primarily English-speaking Hispanics earn higher scores than Spanish-speaking Hispanics among students in agriculture programs. Finally, gifted students had much higher scores on the science test than did non-gifted peers, with those in agriculture programs scoring 32 points higher.

The influence of school attributes on students' science test scores was generally insignificant. One exception was the average school score on the test, which was significant and positive but not a powerful predictor. For example, a student enrolled in an agriculture program at a school with an average score one standard deviation higher (note that all interval level predictors were grand mean centered) than the average for schools would score .335 points higher on the test. Also of note is that school location had some effect on test scores for students in the health sciences and STEM programs (where students attending center-city schools tended to score lowest). A similar pattern was present but nonsignificant for agriculture students. Perhaps most surprising was that expenditures for career and technical education showed no effect on students' science test scores.

Overall, the hierarchal linear models account for a significant amount of the variance in test scores. Of the variance between schools, the model accounted for 56.1% (i.e., (220.1-96.6)/220.1) for agriculture programs, 80.6% for health science programs, and 77.9% for STEM programs. Of the variance within schools, 15.2%, 14.9% and 15.9% for agriculture, health science, and STEM programs, respectively, was accounted for by the model.

Table 3.
Regression of FCAT Science scores on curriculum, student and school attributes for selected programs.

	Agriculture	Health	STEM
Intercept	274.4	270.7	281.5
Curriculum attributes			
CTE involvement:			
Coursetaker	**0.0**	**0.0**	**0.0**
Explorer	**5.5**	**2.5**	**3.1**
Concentrator	**10.3**	**12.2**	**10.8**
College preparation coursework	**30.5**	**19.8**	**28.3**
Student attributes			
Age (months)			
Less than 200 months	**22.7**	**30.1**	**29.8**
200 to 212 months	**2.8**	**8.2**	**13.3**
210 to 213 months	**21.3**	**29.6**	**28.4**
214 or more months	**0.0**	**0.0**	**0.0**
Male	**7.3**	**11.7**	**10.4**

Race-ethnicity:			
White, non-Hispanic	**0.0**	**0.0**	**0.0**
Black, non-Hispanic	**-29.5**	**-26.7**	**-29.9**
Hispanic	**-.9**	**-8.3**	**-8.8**
Asian, Pacific Islander	**6.3**	**2.3**	**1.0**
Other	**.5**	**-8.8**	**-4.0**
Primary language spoken:			
English	**0.0**	**0.0**	**0.0**
Spanish	**-14.2**	**-12.6**	**-6.9**
Other	**-7.9**	**-8.4**	**-4.7**
Gifted	**32.0**	**23.6**	**33.0**
School attributes			
Mean school FCAT Science score	**.355**	**.296**	**.438**
School enrollment	-.0018	**.003**	-.0016
Per pupil expenditures for CTE	.0008	-.0005	.0006
Percent Gifted (0)	.117	.016	.370
Percent free and reduced price lunch	**-.136**	.013	.014
Percent absent 21 or more days	.187	-.090	.045
Graduation rate	-.150	-.003	**-.105**
Stability rate	-.311	-.260	-.318
Percent In-school suspensions	.153	-.087	.063
Out-of-school suspensions	**-.419**	**.269**	.125
School location:			
Large city (>250,000)	-15.7	**-8.4**	**-24.2**
Mid-sized city (<250,000)	-9.3	**-8.5**	**-23.6**
Urban fringe of a large city	-10.1	**.5**	**-9.8**
Urban fringe of a mid-sized city	-10.5	**-2.9**	**-12.5**
Town	-11.7	**-5.7**	**-15.8**
Rural, outside CBSA	-9.5	**-3.7**	**-16.7**
Rural, inside CBSA	0.0	**0.0**	**0.0**
Variance components			
Between school variance, null model	220.1	263.3	384.7
Within school variance, null model	2453.8	1942.8	2377.5
Between school variance, full model	96.6	51.0	85.2
Within school variance, full model	2079.0	1653.1	1998.9

Parameter estimates shown in **bold** are significant at .05 level.

Conclusions and Discussion

The data analysis provides clear evidence that as involvement in a CTE program increases from coursetakers to explorers and then to occupational concentrators, performance on the standardized science test is enhanced. In addition, students who take college preparatory coursework in tandem with CTE courses perform much better than peers who do not. These findings were consistent for students enrolled in courses for agriculture, health and STEM programs. Similar results are reported for other studies (U.S. Department of Education, 2004).

The HLM analysis also shows that students who were concentrators in agriculture programs scored on par with health students and slightly lower than STEM students after controlling for student and school attributes. This suggests that a part of the differences in tests scores between the programs in the initial analysis were due to the composition of the students and schools. Students in agriculture programs were less likely to have college preparatory coursework, more likely to qualify for free or reduced price lunch, and attend a rural school, and these factors may serve to put agriculture students at a disadvantage.

The findings from the analysis show the important role that CTE curricula, including that of agriculture programs, can have on science knowledge as measured by the FCAT test. It appears that students who focus their efforts within a particular occupational area benefit more than those who earn only a few credits or explore multiple programs. One reason might be that occupational concentrators gain an advantage of cumulative learning within an area which, in turn, facilitates connections with science concepts. The benefits that accrue to concentrators on the science test may be important to building a stronger foundation for these students to compete for science-oriented positions in the emerging information economy.

While the findings demonstrate an important association between students' involvement in CTE curricula and performance on the FCAT science test, the use of standardized tests for measuring science knowledge has its critics (cf., Linn, 2001). Consequently, some caution should be exercised in interpreting the results. Other measures of science knowledge, such as grades earned in science courses, can be used to validate the results reported here.

Recommendations

Given that students who were concentrators in a CTE program performed significantly better on the standardized science test, parents, teachers, and guidance counselors should encourage their students to be more selective in choosing courses. In short, students should be encouraged to select a set of courses that comprise an occupational concentration. This strategy has the advantage of providing depth which enhances learning and application processes. To that end, information on the cumulative impact of CTE concentrators should be disseminated in appropriate formats to students, parents, guidance counselors, administrators, and policy makers. Further research in this area is needed to gain a fuller understanding of the variables impacting student success.

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Agricultural and Natural Resource CTE Programs and Science Achievement: How Does it Compare with Other CTE Programs?

Discussant Remarks by Kim E. Dooley

The authors set the stage with the American Association for the Advancement of Sciences emphasis: "science starts with questions about nature, engages students in real-world settings, and stresses active learning strategies." The knowledge gap that prompted this study was the need to explore the differential influence of specific curricula on students' performance. The use of an ecological model to holistically explore learning was the conceptual model to determine nested factors affecting student outcomes in math and science. The authors add that there are individual and school attributes that impact learning. These attributes include race, ethnicity, gender, innate ability; and socioeconomic background, number of students enrolled, and nature of the learning climate.

This study used administrative records from the Florida Department of Education's data warehouse. Specifically, the Florida School Indicators Report was used to determine student demographics, courses, awards, and standardized test scores. To assess student achievement in CTE programs, a cohort of students who had earned credits in at least one CTE program and had a criterion-referenced science test score (FCAT) were selected. These test scores were the dependent variable. The independent variables were curriculum investment (categorical) and college preparatory coursework (binary). Moderator and mediator variables included student background and school attributes.

This study used sophisticated statistical analyses. It was evident from the findings that as involvement in a CTE program increases, so does performance on the standardized science test. Across all program areas (agriculture, health, and STEM), taking more college preparatory coursework increases performance. However, agriculture students were less likely to have college preparatory coursework, more likely to qualify for free or reduced lunches, and attended rural schools—all factors that could be a disadvantage in science achievement.

How can these findings be implemented to improve learning outcomes? We obviously can't change the individual student attributes, but we can be more cognizant of the school attributes. Counselors and teachers should encourage more participation in college preparatory course and CTE programs to improve science content knowledge. Agriculture programs are well situated to emphasize understanding nature and real-world problems through the use of active learning.

A Study of Pre-service Agricultural Education Students: Knowledge of Horticulture and Self-efficacy to Teach Horticulture

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Abstract

This study included pre-service agricultural education students (22) enrolled in an introductory horticulture course at Oklahoma State University. The purpose of this descriptive correlational study was to determine pre-service agricultural education students' knowledge of horticulture and their perceived self-efficacy to teach horticulture in secondary agricultural education. It was found that over two-thirds (68.2%) of the agricultural education students who participated in this study did not possess any years of horticulture work experience. Additionally, 63.9% reported they completed no high school horticulture courses, and 77.3% of the students had not completed any college horticulture courses. Prior to instruction, the students reported their self-efficacy to teach selected horticulture skills standards as "Below Average." However, at the end of instruction, the students perceived their self-efficacy to teach the selected horticulture skills standards as "Average confidence." It was revealed that students' horticulture knowledge mean test score increased from 48.32% prior to instruction to 62.96% at the end of instruction.

Introduction

Horticulture is an important and diverse industry in the United States. Major content areas of horticulture include nursery, floriculture, landscape, and turf (McMahon, Kofranek, & Rubatzky, 2007). This industry provided nearly two million jobs and generated 147.8 billion dollars in 2002 (Hall, Hodges, & Haydu, 2005). Krause et al. (2004) emphasized the economic impact of horticulture in the United States when they stated, "Horticulture is one of the fastest growing enterprises in U.S. agriculture . . . " and ". . . it produces over 10% of all income from agricultural products" (p. 375). Aspects of the horticulture industry comprise the curriculum of secondary agricultural education in many states, including Oklahoma (Oklahoma Department of Career and Technology Education, 2007). So, secondary agricultural education teachers should receive instruction during their pre-service preparation that will enable them to teach horticulture effectively.

"Research suggests that a good teacher is the single most important factor in boosting [student] achievement, more important than class size, the dollars spent per student, or the quality of

textbooks and materials" (Wallis, 2008, p. 28). The No Child Left Behind Act (NCLB) was designed to ensure all students were being held to the same expectations; therefore, teachers need to be accountable for their practice and related student learning outcomes. Martin, Fritzsche, and Ball (2006) stated, "Accountability will be enforced primarily through yearly standardized testing to measure student performance" (p. 100). Because teachers are the single most important influence on student achievement, teacher education programs need to provide learning experiences for pre-service educators that impact their self-efficacy to teach pertinent subject matter.

Approximately, one-half of the 11,000 secondary agricultural educators in the United States teach horticulture courses (National FFA Organization, 2008). A large enrollment of secondary agricultural education students in horticulture classes in the United States demands that teachers be competent in horticultural knowledge and skills (Franklin, 2008). Wingenbach, White, Degenhart, Pannkuk, and Kujawski (2007) stated,

> Highly qualified teachers are defined in the No Child Left Behind Act of 2001 (NCLB) as those who not only possess state certification, but who also have content knowledge of the subjects they teach. In Career and Technical Education (CTE), teachers need to be competent in technical, employability, and academic skills. Additionally, high-quality CTWE [Career Technical/Workforce Education] teachers are essential in helping the United States develop a 21st-century workforce that will be competitive in the world marketplace. (pp. 114-115)

Teachers need to be "comfortable" (i.e., self-confident) in teaching horticultural science in addition to understanding the technical knowledge. Researchers who studied pre-service agricultural education students' knowledge and teaching comfort level concluded, "As pre-service teachers' knowledge increased, so did their teaching comfort and vice versa . . ." (Wingenbach et al., 2007, p. 123). Moreover, Knobloch and Whittington (2002) reported that when an agricultural educator has a high level of self-efficacy, he or she will be more effective teaching agricultural content to students than teachers who possess a low level of self-efficacy. Stripling, Ricketts, Roberts, and Harlin (2008) paraphrased Albert Bandura when they posited,

> Competent teachers and the expected skills they ought to possess may be the most important factors contributing to the success of students. Confidence in one's ability to be a skillful, effective, and competent teacher is important because this confidence generally leads to fulfillment of these expectations. (p. 120)

Theoretical/Conceptual Framework

The theoretical framework for this study was based on self-efficacy theory (Bandura, 1997). According to Bandura, "Perceived self-efficacy is the beliefs in one's capabilities to organize and execute the courses of action required to produce a given attainment" (p. 3). Self-efficacy differs from other expectancy beliefs, because it is based on a specific belief to obtain a predetermined outcome (Pajares, 1996). In this study, confidence to teach horticulture standards and self-efficacy are used interchangeably based on instrument development work done by Bandura (2006). Bandura (1989) expounded on the idea that as an individual's perceived self-

efficacy increased, he or she would set higher goals. In addition to raising goals, the individual also will be able to endure and achieve difficult tasks or goals (Bandura, 1992).

Johnson, Ferguson, and Lester (2000) concluded that students who had used computer applications or believed they had a high skill level for operating selected computer applications had a high confidence level when using selected computer applications. Providing rationale for investigating pre-service educators' perceived self-efficacy, Zarafshani, Knobloch, and Aghahi (2008) stated, "General self-efficacy is a trait-like construct of a set of expectations people use to determine how successful they believe they can be or perform in a wide range of new and challenging situations" (p. 72).

In multiple types of efficacy (i.e., teacher efficacy or collective efficacy), the foundation of efficacy develops from four sources of information: mastery experiences, vicarious experiences, verbal persuasion, and physiological state (Bandura, 1997). Bandura stated that, "Each of the four modes of conveying information about personal capabilities has its distinctive set of efficacy indicators" (p. 79).

As pre-service students enter a teacher education program, a vision should be developed by the student to establish an idea or model which exemplifies effective teaching characteristics and a well developed foundation of content knowledge. The vision developed by a pre-service teacher impacts all other values, including understanding, practices, dispositions, and tools.

According to Darling-Hammond and Bransford (2005), each value can be described as follows: "Understanding" is the value in which a prospective educator develops pedagogical and content knowledge of a specific subject area; examples include agriculture, mathematics, construction engineering, and reading. "Practice" is an application process where a prospective educator would organize and execute lessons, per his or her specified content area. "Dispositions" could be abstract thought or structured reflection on practicing the teaching and learning process for students and teacher. The value "Tools" consists of items such as educational theories, teaching methods, and lesson plans, which the educator uses to construct and organize effective learning experiences.

Darling-Hammond and Baratz-Snowden (2005) stated, "Being prepared to teach subject matter requires deep content knowledge of the content itself, the process for learning this content, and the nature of student thinking, reasoning, understanding, and performance within a subject area" (p. 17). Content knowledge is one piece of the value "understanding." This is a value that educators must develop and organize to teach students effectively.

This study primarily investigated knowledge-*for*-practice, because of its focus on pre-service education (Cochran-Smith & Lytle, 1999). Embedded in this relationship is the knowledge a teacher gains through formal education in preparation for the teaching profession (Cochran-Smith & Lytle). Feiman-Nemser (2001) stated, "If teachers are responsible for helping students learn worthwhile content, they must know and understand the subjects they teach" (p. 1017). Additionally, the knowledge teachers gain from pre-service education is knowledge which average people in society would generally not know (Cochran-Smith & Lytle). Pre-

service education is where a teacher gains the pedagogical skills and content knowledge, per his or her discipline, within the knowledge-*for*-practice relationship (Cochran-Smith & Lytle).

In this study, the mean grade point average (GPA) in the required introductory horticulture course for teacher licensure was lower historically when compared to other required agricultural courses. Also, the expected mean score on the horticulture segment of the Oklahoma Agriculture Subject Area Examination was lower then expected over three years. These assessment measures, along with observations by faculty in horticulture and agricultural education provided rationale to conduct this study: Determine the horticulture knowledge pre-service agricultural education students gained in the required horticulture course and their perceived level of self-efficacy to teach horticulture.

Purpose and Objectives

The two-fold purpose of this descriptive-correlational study was to determine pre-service agricultural education students' knowledge of horticulture and their perceived self-efficacy to teach horticulture in secondary agricultural education.

1. Describe selected personal characteristics (age, gender, major, academic course work in horticulture, and horticulture work experience) of pre-service agricultural education students enrolled in a required introductory horticulture course at Oklahoma State University.

2. Describe pre-service agricultural education students' knowledge of selected horticulture skills standards in secondary agricultural education.

3. Describe students' perceived self-efficacy to teach selected horticulture skills standards in secondary agricultural education.

4. Describe the relationship between the pre-service agricultural education students' perceived self-efficacy to teach selected horticulture skills standards and their knowledge of horticulture and years of horticulture work experience.

Methods and Procedures

The population for this study included pre-service agricultural education students enrolled in a required introductory horticulture course. A total of 22 pre-service students were enrolled in the course during the fall 2008 semester. All students were majoring in agricultural education or a related option with the intent of seeking a license to teach agricultural education in grades 6-12.

A review of literature found that no instruments were available to measure a student's horticultural knowledge and perceived confidence to teach horticulture skills standards relevant to the state's secondary agricultural education curricula. Therefore, the researcher (Kennel, 2009) developed an instrument which included three sections: Section I, Perceived Confidence and Importance to Teach Horticulture Skills Standards; Section II, Horticulture Knowledge; and

Section III, Personal Characteristics Information (age, gender, major, academic course work and experience in horticulture).

Section I of the instrument was developed to investigate the pre-service agricultural education students' perceived confidence (i.e., self-efficacy) to teach selected state horticulture skills standards. The selected state horticulture skills standards identified for this study were cross-referenced with the horticulture course's content. After cross-referencing the skills standards and the course content, 27 horticulture skills standards were identified and used to formulate Section I. In developing Section I of the instrument, the researcher used the construct "confidence" to measure a pre-service student's self-efficacy to teach the selected skills standards (Bandura, 2006). To determine self-efficacy, the researcher used a five point summated rating scale: "1" = "No confidence," "2" = "Below average confidence," "3" = "Average confidence," "4" = Above average confidence," and "5" = "High confidence." Section II, Horticulture Knowledge, consisted of a 27 question objective test. Standards developed by the Oklahoma Department of Career and Technology Education (2007) guided the selection of the horticulture knowledge questions included on the horticulture knowledge test section of the instrument. After cross-referencing the state horticulture skills standards to the course content of the introductory horticulture course, the researcher selected 27 skills standards that were included in the course's content (Kennel, 2009). These horticulture skills standards were used, because agricultural education teachers are expected to be able to teach the skills on completion of their Bachelor's of Science degree and receipt of initial teaching license in agricultural education in this state (Leising, Edwards, Ramsey, Weeks, & Morgan, 2005).

The selected skills standards were cross-referenced to the course's test question bank to establish congruency between course content and the skills standards. The questions in this test question bank had been used in the course for approximately 10 semesters and were considered valid by the faculty teaching the course. Each test question was cross-referenced directly to one of the state's agricultural education horticulture skills standards. These 27 questions composed the criterion-referenced horticulture knowledge test, i.e., Section II of the instrument.

Content validity of the instrument used in this study was reviewed by a panel of experts that consisted of two horticulture faculty members, two teacher educators in agricultural education, two agricultural educators possessing six or more years of experience teaching horticulture, and one agricultural communications faculty member (Wiersma & Jurs, 1990). The panel of experts reviewed the instrument to confirm face and content validity.

This instrument was field tested with pre-service agricultural education students enrolled in an agricultural education program planning course in spring 2008. A total of 44 students participated in the field test and were asked to write comments about ways to clarify the wording of the instrument and to identify questions that were unclear or vague. As a result of the field test, the instrument was edited further and the format was adjusted, but no change in its content was made.

An instrument's reliability is addressed to determine if the instrument could be utilized multiple times and produce similar responses (Hambleton & Novick, 1973; Wiersma & Jurs, 1990). Criterion-referenced tests, such as the horticulture knowledge test in this study, do not require

reliability coefficients (e.g., Cronbach's coefficient alpha) to address reliability, as do norm references tests (Wiersma & Jurs, 1990). However, Wiersma and Jurs (1990) posited eight ways to address reliability of a criterion-referenced test. The researcher adhered to these guiding principles when responding to the panel of experts' feedback regarding improvements to the study's instrument.

To that end, the researcher addressed the suggestions posed by Wiersma and Jurs (1990) to increase reliability of the criterion-referenced test as follows: *Homogeneous items:* the questions utilized in the criterion-referenced test (Section II) were cross-referenced directly with the agricultural education horticulture skills standards and the introductory horticulture course's content; *discriminating items:* all items on the instrument were analyzed using item difficulty scores calculated by the university assessment and testing center; e*nough items:* the criterion-referenced test included 27 test questions and each question was cross-referenced to a horticulture skill standard. Twenty seven of the 278 horticulture skills standards were used. These were representative of the skills standards taught in the introductory horticulture course; *high quality copying and format:* the instrument booklet was copied using a laser ink jet copier and the Scantron forms were professionally formatted by the Oklahoma State University assessment and testing center. The panel of experts reviewed the instrument's format and students involved in the field test also made suggestions to eliminate ambiguous wording; *clear directions for the students:* the students were provided written instructions explaining how to complete the Scantron forms; a *controlled setting:* the instrument was administered in a classroom setting during a regularly scheduled class session on the university's campus; *motivating introduction:* the detailed informed consent form included an introduction that informed the students how the data collected from the instrument would be used; *clear directions to the scorer:* the Scantron forms completed by the study participants were electronically scored by the university assessment and testing center.

The instrument was administered to 22 pre-service agricultural education students in August 2008 prior to instruction in the introductory horticulture course, and at the end of instruction in late November 2008. The instrument was administered in two parts: first, Section I, Perceived Confidence and Importance to Teach Horticulture Skills Standards was administered, and second, Section II, Horticulture Knowledge Test, and Section III, Personal Characteristics Information. All instruction addressing the skills standards except "temperature and moisture requirements for postharvest plant storage" had occurred prior to the testing date. Because that skill standard was not taught prior to the second administration, the researcher did not use data from this skill standard either prior to or at the end of instruction; so, data for 26 skills standards were analyzed (Kennel, 2009).

The programs SPSS 15.0 for windows and Microsoft Excel 2007 were used by the researcher to analyze the data. The researcher used frequencies, population means, and population standard deviations to describe selected personal characteristics of pre-service agricultural education students and their self-efficacy to teach selected horticulture skills standards. The researcher calculated a non-parametric Kendall's *tau* correlation coefficient between students' self-efficacy to teach horticulture, horticulture knowledge achievement score, and years of horticulture work experience. A Kendall's *tau* correlation coefficient should be used ". . . when you have a small data set with a large number of tied ranks" (Field, 2000, p. 92).

To classify the correlation coefficients, the researcher used Davis' (1971) conventions to describe the magnitudes of the correlations.

Findings/Results

Objective 1. Describe selected personal characteristics of pre-service agricultural education student enrolled in the required introductory horticulture course.

Of the total population, 11 students (50%) were 21 years old, seven (31.8%) were female, and 15 (68.2%) were male. Slightly more than 50% (12) of the pre-service agricultural education students reported a grade point average (GPA) ranging from 3.1-4.0, and 10 students indicated a GPA ranging from 2.1-3.0. Additionally, 63.6% (14) were majoring in only agricultural education; however, 36.4% (8) were earning double majors in animal science and agricultural education. Based on the Oklahoma State University classification of students, the population included 4.5% (1) freshman (< 28 earned semester credit hours), 18.2% (4) sophomores (28 to 59 earned semester credit hours), 36.4% (8) juniors (60 to 93 earned semester credit hours), and 40.9 % (9) seniors (≥ 94 earned semester credit hours).

The majority (68.2%) of the agricultural education students who participated in this study did not report any years of horticulture work experience. Five students indicated one or more years of horticulture work experience. Only 27.3 % of the students participated previously in agricultural education horticulture activities, and 4.5% of the students were involved in 4-H horticulture activities. Of the total population, 63.9% of the students reported they completed no high school horticulture courses, and 77.3% of the students had not completed any college horticulture courses at the time of the study.

Objective 2. Determine the pre-service agricultural education students' knowledge of selected horticulture skills standards.

The pre-service agricultural education students enrolled in the introductory horticulture course completed a criterion-referenced test prior to and at the end of instruction. The mean percent correct on the criterion-referenced test prior to instruction was 48.32% and the end of instruction mean was 62.96% (Table 1).

Table 1

Pre-service Students' Knowledge Test Scores in Horticulture Prior to and at the End of Instruction

			Range	
			Minimum	Maximum
	μ	σ	(%)	(%)
Prior to Instruction Test Scores	48.32	12.44	25.93	74.07

End of Instruction Test Scores	62.96	14.14	33.33	88.89

Objective 3. Determine the pre-service agricultural education students' perceived self-efficacy to teach horticulture.

To determine self-efficacy of the pre-service agricultural education students, a self-efficacy mean
score was calculated for each of the skills standards (Table 2). Prior to instruction, students perceived their self-efficacy to teach the selected horticulture skills standards as "Below average" ($\mu = 2.37$). Two skills standards, "plant propagation using air layering" ($\mu = 1.59$) and "techniques of seed stratification" ($\mu = 1.95$), were perceived as "No confidence" to teach. At the end of instruction, students perceived that they held "Average confidence" for 20 of the 26 skills standards. However, regarding the remaining six skills standards the students perceived their self-efficacy to teach the horticulture skills standards as "Below average" (Table 2).

Prior to instruction, students had higher self-efficacy to teach "operation of different kinds of turf/lawn mowers" ($\mu = 2.91$), "irrigation of field grown plants" ($\mu = 2.91$), "the effects of insufficient spacing of plants" ($\mu = 2.77$), "maintenance practices of cool and warm season grasses" ($\mu = 2.64$), and "the effects of overspraying and underspraying diseased plants" ($\mu = 2.59$) than after. However, the five standards were classified as "Below average" (i.e., $\mu = 2.00$-2.99) (Table 2). Conversely, students perceived themselves as least efficacious to teach "techniques for grafting trees" ($\mu = 2.09$), "techniques for applying rooting hormone" ($\mu = 2.05$), "preparation techniques of growing media" ($\mu = 2.00$), "techniques of seed stratification" ($\mu = 1.95$), and "plant propagation using air layering" ($\mu = 1.59$) prior to instruction (Table 2).

Table 2 also includes students' perceptions of self-efficacy to teach the selected horticulture skills standards at end of instruction for the course. The students' indicated highest perceived self-efficacy for teaching five of the skills standards: "techniques for applying rooting hormone" ($\mu = 3.77$), "techniques for pinching plants" ($\mu = 3.73$), "techniques of seed stratification" ($\mu = 3.73$), "techniques for disbudding plants" ($\mu = 3.64$), and "transplanting plant materials to the field" ($\mu = 3.59$). Two skills standards, "techniques for applying rooting hormone" and "techniques of seed stratification," rated as least efficacious prior to instruction, were rated in the top five at the end of instruction.

At the end of instruction, the five skills standards for which pre-service students perceived they held the lowest self-efficacy were "preparation techniques of growing media" ($\mu = 2.95$), "the effects of plant photoperiod regulation" ($\mu = 2.86$), "maintenance of greenhouse irrigation systems" ($\mu = 2.82$), "harvesting techniques of trees and shrubs" ($\mu = 2.77$), and "identification of common turf diseases and pests" ($\mu = 2.59$) (Table 2).

Overall, pre-service agricultural education students' perceived self-efficacy to teach horticulture increased from prior to instruction ($\mu = 2.37$) compared to the end of instruction ($\mu = 3.26$). The students' self-efficacy mean scores were divided between "Average confidence" (3.00-3.99) and "Below average" (2.00-2.99) at the end of instruction. This differs from prior to

instruction, because the majority of responses were "Below average" (μ = 2.00-2.99). No notable differences in students' perceived self-efficacy were detected within or among the three thematic areas of the course: greenhouse/nursery; fruit/nut and vegetable; and landscape maintenance.

Table 2

Comparison of Pre-Service Agricultural Education Students' Perceptions of Self-efficacy to Teach Select Horticulture Skills Standards Prior to and at the End of Instruction

	Self-efficacy				
	PI[a]		EI[b]		Mean
Skills Standards	μ	σ	μ	σ	Diff.
Greenhouse/Nursery					
Transplanting techniques for trees that are bare-root or in liners	2.27	0.98	2.95	1.05	+ 0.68
Techniques for pinching plants	2.45	1.06	3.73	1.03	+ 1.28
The effects of insufficient spacing of plants	2.77	0.87	3.23	1.07	+ 0.46
Techniques for applying rooting hormone	2.05	1.13	3.77[c]	1.11	+ 1.72
Planting techniques for shrubs and trees: bare-root, container, & burlap	2.32	0.78	3.14	0.89	+ 0.82
Plant propagation using air layering	1.59[d]	0.96	3.18	1.05	+ 1.59
Techniques for disbudding plants	2.23	1.06	3.64	0.95	+ 1.41
Maintenance of greenhouse irrigation systems	2.27	0.98	2.82	0.96	+ 0.55
Scarification of seeds	2.36	1.14	3.45	1.01	+ 1.09
Appl. techniques of plant growth regulators	2.59	1.01	3.50	0.80	+ 0.91
The effects of plant photoperiod regulation	2.32	0.99	2.86	0.71	+ 0.54
ID of bulbs, tubers, & tuberous roots	2.36	1.18	3.55	1.06	+ 1.19
Harvesting techniques of trees & shrubs	2.18	1.05	2.77	1.07	+ 0.59
Composite mean	2.29		3.28		+ 0.99
Fruit/Nut & Vegetable					
Techniques for grafting trees	2.09	0.81	3.05	0.72	+ 0.96
Calculating seed germination percentages	2.45	1.18	3.32	1.04	+ 0.87
Techniques of seed stratification	1.95	0.90	3.73	0.94	+ 1.78[c]
Preparation techniques of growing media	2.00	0.87	2.95	0.90	+ 0.95
Hardening-off process of seedlings & cuttings	2.18	0.96	3.18	1.01	+ 1.00
Techniques for pruning trees	2.59	1.10	3.36	0.90	+ 0.77
Techniques for staking trees	2.45	0.96	3.23	1.11	+ 0.78
The effects of over/underspray. diseased plts	2.59	1.14	3.09	0.68	+ 0.50
Irrigation of field grown plants	2.91	0.87	3.45	0.80	+ 0.54
Transplanting plant materials to the field	2.55	0.86	3.59	0.91	+ 1.04
Composite mean	2.38		3.30		+ 0.92
Landscape Maintenance					
ID of common turf diseases & pests	2.55	1.10	2.59[d]	0.80	+ 0.04[d]
Maint. pract. of cool & warm season grasses	2.64	0.90	3.23	0.87	+ 0.59
Oper. of different kinds of turf/lawn mowers	2.91[c]	1.02	3.50	1.06	+ 0.59

Composite mean	2.70	3.11	+ 0.41
Overall Composite Mean	2.37	3.26	+ 0.89

Note. Self-efficacy scale: "1"= "No confidence"; "2" = "Below average confidence"; 3 = "Average confidence"; "4" = "Above average confidence"; "5" = "High confidence"
[a]Prior to Instruction; [b]End of Instruction; [c]Maximum; [d]Minimum

Objective 4: Determine the relationship between pre-service agricultural education students' perceived self-efficacy to teach selected horticulture skills standards and their knowledge of horticulture and years of horticulture work experience.

A low positive correlation (Davis, 1971) was found between self-efficacy to teach horticulture and horticulture knowledge at the end of instruction; a negligible negative correlation was found prior to instruction (Table 3). The researcher also computed a Kendall's *tau* correlation coefficient to determine if a relationship existed between self-efficacy to teach horticulture and horticulture work experience (Table 3). A low positive correlation was found prior to instruction; however, a negligible negative correlation was found at the end of instruction.

Table 3

Kendall's tau (τ) Correlation Coefficient Between Pre-service Teachers' Perceived Self-efficacy, Horticulture Knowledge, and Work Experience Prior to and at the End of Instruction

	Horticulture Knowledge		Work Experience	
	Prior to Instruction τ	End of Instruction T	Prior to Instruction τ	End of Instruction τ
Self-efficacy	-.050[a]	.178[b]	.161[b]	-.091[a]

Note. [a]Correlation coefficients ranging from -.01 to -.09 are negligible negative associations; [b]correlations coefficients ranging.10 and .29 are low positive associations (Davis, 1971).

Conclusions and Recommendations

A majority of pre-service agricultural education students in this study were male. They possessed similar characteristics including age, major, and grade point average when compared to studies conducted by Young and Edwards (2006) and Johnson, Ferguson, and Lester (2000). More than one-half of the population was classified as junior or senior students. Similar to Franklin (2008), over two-thirds of the students had no years of horticulture work experience. Also, the pre-service agricultural education students reported not being enrolled in any college-level horticulture courses before enrolling in the introductory horticulture course studied.

Students' horticulture knowledge of the selected skills standards increased from the beginning to the end of instruction. Although an increase in horticulture knowledge was revealed, it should be

noted that the mean horticulture knowledge score was equivalent to a grade of "D" (60-69%) at the end of instruction, based on the grading scale used in the course.

Regarding research objective three, the pre-service agricultural education students' overall mean self-efficacy scores to teach horticulture skills standards increased from the beginning (2.37) to the end of instruction (3.26). The five skills standards with the highest self-efficacy mean scores, i.e., "Average confidence," were "techniques for applying rooting hormone" (3.77), "techniques for pinching plants" (3.73), "techniques of seed stratification" (3.73), "techniques for disbudding plants" (3.64), and "transplanting plant materials to the field" (3.59). Notably, these skills standards were taught using applied teaching methods in the laboratory portion of the course. This conclusion was supported by Bandura (1997): As students' range of mastery experiences expands, self-efficacy will increase or decrease depending on the quality of the experiences.

Concerning research objective four, a low positive correlation existed at the end of instruction between pre-service agricultural education students' horticulture knowledge and their perceived self-efficacy to teach horticulture. However, prior to instruction, a negligible negative correlation existed between horticulture knowledge and self-efficacy to teach horticulture. Although the correlation coefficients were not statistically significant, the relationships found were supported by Bandura's theory of self-efficacy (Bandura, 1997). As pre-service agricultural education students' horticultural knowledge increased, their self-efficacy to teach horticulture increased. Wingenbach et al. (2007) reported similar findings for pre-service agricultural education teachers in Texas.

The correlation coefficients calculated between years of horticulture work experience and self-efficacy were supported by the theory of self-efficacy (Bandura, 1997). Students' years of horticulture work experience did not change during the study, but students' self-efficacy increased from the beginning to the end of instruction. Therefore, the negative relationship between years of horticulture work experience and self-efficacy found at the end of instruction was anticipated.

Caution should be taken when generalizing the results of this study beyond the population examined and/or similar groups of students who may enroll for the horticulture course that was investigated. Further, due to the small population size of this study, it is recommended that this study be replicated over multiple semesters to determine if a relationship exists between self-efficacy to teach horticulture and horticulture knowledge in other groups of students and other pre-service agricultural education programs. Also, research should be conducted to determine if the horticulture instructional needs of pre-service agricultural education students at other universities are similar or different to those described in this study.

In this study, pre-service agricultural education students perceived their self-efficacy to teach horticulture as "Average confidence." The relatively unremarkable self-efficacy reported also raises questions regarding the self-efficacy of in-service agricultural teachers who teach horticulture and their knowledge of horticulture. Therefore, it is recommended that the self-efficacy of in-service agricultural education teachers be studied to understand better the role that experience may play regarding a teacher's perception of self-efficacy to teach horticulture.

The pre-service agricultural education students studied possessed very little knowledge about horticulture prior to enrolling in the introductory horticulture course. However, the majority of pre-service agricultural education students reported they had been enrolled in secondary agricultural education programs or participated in 4-H programs as youths. To assist students in gaining horticulture experience, secondary agricultural education teachers as well as 4-H educators and adult volunteers should promote more educational experiences focused on students acquiring horticulture knowledge and skills.

It was found that students were most efficacious to teach skills standards that were learned in the laboratory portions of the course. So, it is recommended that the course's instructors consider using additional applied teaching and learning methods when teaching students horticultural principles and concepts (Bandura, 1997).

Implications/Discussion

According to the Oklahoma Department of Career and Technology Education, horticulture is a career pathway that may be taught in secondary agricultural education programs. Based on the findings of this study, pre-service agricultural education students are entering college with minimal horticulture knowledge. Additionally, pre-service students bring ideas about what their teacher preparation should encompass to their initial professional development experiences (Feiman-Nemser, 2001). Accordingly, students who have not been exposed to horticulture educational experiences or horticulture work experiences prior to college may consider this context of agriculture less valuable than others. These individuals whom have not had experiences via the four sources of efficacy, i.e., mastery experience, vicarious experience, physiological state, or verbal persuasion, would be expected to possess low self-efficacy regarding the accomplishment of specific tasks (Bandura, 1997).

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A Study of Pre-service Agricultural Education Students: Knowledge of Horticulture and Self-efficacy to Teach Horticulture

Discussant Remarks by Kim E. Dooley

The introduction for this manuscript makes the case that teachers have the most influence on student achievement. If you really stop to think about this, that is a tremendous responsibility. I realize that ultimately the students must be motivated to learn and have their basic needs met before they can demonstrate their intellectual capabilities. However, teachers who lack subject matter knowledge and the ability to effectively communicate their content could negatively influence student outcomes. It is important for teacher educators to help our pre-service teachers gain the confidence and competence necessary to masterfully convey their subject.

The authors use Bandura's self-efficacy theory as the framework for the study. They further embellish upon the concept of "knowledge-for-practice" through formal education and professional preparation.

The purpose and research objectives were focused on describing personal characteristics, content knowledge, and self-efficacy of pre-service students enrolled in an introductory horticulture course at Oklahoma State University. The relationship between the pre-service students' self-efficacy and their knowledge and experience of horticulture was also determined. The population was limited to 22 pre-service students enrolled in an introductory horticulture course, majoring in agricultural education, and seeking certification to teach. I would suggest that the sample was purposive and further research is needed in order to determine the generalizability of the results, as was stated in the conclusion section of the paper. The data collection instrument was created by the researcher. In addition to demographic variables, the instrument was designed to measure self-efficacy using a 5-point summated rating scale with 1 being "no confidence" to 5 being "high confidence." The other section was an objective test of horticulture knowledge based upon skills standards.

The students completed the criterion-referenced test prior to and at the end of instruction. In general, students perceived their self-efficacy to teach horticulture as "below average" before the course and "average" after the course. There was a low positive correlation found between self-efficacy and horticulture knowledge after instruction.

Overall the agricultural education majors had little prior knowledge or experience with horticulture. If horticulture is a subject that they will likely teach, it would be appropriate to require formal coursework in this area within the teacher preparation curriculum. Professional development workshops for current teachers would also enhance the confidence, knowledge, and skills of these teachers.

Impact of Gender, Ethnicity, Year in School, Social Economic Status, and State Standardized Assessment Scores on Student Content Knowledge Achievement When Using Vee Maps as a Formative Assessment Tool

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Abstract

The National Research Council has recognized the challenge of assessing laboratory investigation and called for the investigation of assessments that are proven through sound research-based studies. The Vee map provides a framework that allows the learners to conceptualize their previous knowledge as they develop success in meaningful learning when they utilize the Vee map to guide their thinking and the process of experimentation. Previous research has shown that using the Vee map as a formative assessment tool positively affects student content knowledge. The purpose of this study was to compare the impact of student demographic variables on student content knowledge achievement when using the Vee map as a formative assessment tool. The population of this quasi-experimental, counter-balance design study was composed of students at nine high schools that offered agriscience education. The results of this study indicated the Vee map is unbiased based on gender, grade, and ethnicity. It was also concluded that the Vee map does not provide either remedial or non remedial readers with a significant advantage, thus allowing the assessment to focus on the content rather than a student's reading ability.

Introduction

The secondary level of the United States educational system has adopted higher graduation requirements in the areas of English, math and science. As a result, many states experienced a shift of focus toward the core content areas and experienced an increase in overall assessment scores through the 1990s (USDE, 2009). Progression of student driven achievement during the 1990s led to the establishment of academic standards and goals, and the National Center for Education Statistics (NCES) reported stable performance in the science and math subjects and modest gains in reading (USDE, 2000). This focus prompted agricultural education to conduct several studies to demonstrate the science connections in agricultural education and the teachers' willingness to provide agricultural education as an integrated science in the secondary educational curricula (Balschweid, 2002; Balschweid & Thompson, 1999; Balschweid & Thompson, 2002; Connors & Elliot, 1994; Dyer & Osborne, 1999; Johnson & Newman, 1993; Layfield, Minor, & Waldvogel, 2001; Myers, Thoron, & Thompson, 2009; Myers & Washburn, 2008; Newman & Johnson, 1993; Peasley & Henderson, 1992; Thompson, 1998; Thompson & Balschweid, 1999; Warnick & Thompson, 2007; Washburn & Myers, 2008; Welton, Harbstreit, & Borchers, 1994).

However, in the early twenty–first century, No Child Left Behind (NCLB) legislation has remained a driving factor in measuring student achievement (USDE, 2009). In 2000, eighty–two percent of the nation's twelfth graders performed below the proficient level on the National

Assessment of Education Progress (NAEP) science assessment. The document stated, "the longer students stay in the current system the worse they do. According to the 1995 Third International Mathematics and Science Study, U.S. fourth graders ranked second. By twelfth grade, they fell to 16th…" (USDE).

Stagnant and lowering scores in science achievement have caused concern throughout the nation. The USDE (2009, paragraph 13) stated, "researchers have scientifically proven the best ways to teach reading. We must do the same in science. America's teachers must use only research–based teaching methods and the schools must reject unproven fads." Educational researchers have responded to the call by NCLB and the USDE. There have been numerous efforts to improve teaching and learning in the secondary setting (Atkin & Coffey, 2003; Gengarelly & Abrams, 2009). Continued efforts to provide research–based evidence have produced research in the areas of teaching and learning with experimental designs based on standardized testing (Anderson, 2002).

One specific way, identified by the National Research Council (NRC), to increase student performance and scientific knowledge is by shifting a greater focus to hands–on (laboratory) instruction in the science curriculum (NRC, 1996; NRC, 2000). Laboratory investigation is widely accepted as good educational practice (Baker, Thoron, Myers, & Cody, 2008; Baxter, Shavelson, Goldman, & Pine, 1992; Eshe, 2006; Ornstein, 2006; Roth, 1990; Shavelson, Baxter, & Pine, 1991) and teaching agriculture in a laboratory setting has been an integral part of agricultural education for many years (McBryde, 1901; Nolan, 1911; Winslow, 1891). Osborne's (1994) publication built upon this foundation and placed a greater emphasis on teaching using experiments in the agriscience context. Diederen, Gruppen, Hartog, and Voragen (2006) noted that one of the benefits of laboratory instruction is its use as a means to increase a student's understanding and ability to apply knowledge.

While hands-on laboratory experience has been accepted as good teaching, finding assessments that are meaningful to the learner and user-friendly to the teacher remains a challenge (Thoron & Myers, 2009). The National Research Council recognized the challenge of assessing laboratory investigation and called for the investigation of assessments that are proven through sound research-based studies (NRC, 1996). Driver (1995) stated that interventions and expectations set by the teachers promote understanding and those expectations are communicated through assessment techniques.

Thoron and Myers (2009) stated that laboratory reports are commonplace during laboratory experiments. However, once students create a laboratory report teachers have the time-consuming task of grading and commenting on the lengthy reports (Thoron, Swindle, & Myers, 2008). Thoron and Myers also reported that teachers are challenged with the amount of time spent grading laboratory reports and that may lead to fewer experiments being conducted or no assessment of student learning during laboratories. Laboratory reports remain useful, but teachers are essentially assessing the students' abilities to follow directions, collect data, and provide the correct answers to conclusion questions (Novak & Gowin, 1984) and fail to develop deep understanding because students are immersed in the steps and writing required to complete the laboratory report and turn the report in to receive a grade (Lebowitz, 1998). Furthermore, Novak, Gowin, and Johansen (1983) stated that a deepened epistemological structure can be

created by students engaged in quality laboratories with proper assessments. Therefore, examination of empirical evidence supportive of an alternative to the laboratory report is the focus of this study.

Baxter, Shavelson, Goldman, and Pine (1992) stated that dissatisfaction of current assessments, advances in research on cognition and instruction, and reforms in science curricula continue to lead alternative assessment measures for experiments. Shavelson, Baxter, and Pine (1991) stated that continued focus on constructivism lends itself to finding alternative meaningful assessments. The authors stated that educational research should focus on educational measures that go beyond correct responses to reports and focus on conceptual understanding, problem-solving, and application.

Gowin's (1979) Vee map is an assessment tool that can aid in the development of deeper student understanding and a time-friendly formative assessment for teachers to utilize during laboratory investigations (Roehrig, Luft, & Edwards, 2001; Thoron & Myers, 2009). The Vee map is a scaffolding tool that applies Kolb's (1984) model of experiential learning and allows for student manipulation of experiments (Thoron & Myers, 2009). The Vee map does not just require knowledge recall of an experiment, but requires students to formulate a question of investigation, identify key terms, include steps of investigations, create graphic organizers, incorporate data tables, and draw conclusions upon the student guided investigation (See Figure 1). The Vee map may be used in place of a traditional laboratory report (Roehrig, Luft, & Edwards) when appropriate (Thoron & Myers, 2007) at the formative and summative levels (Thoron & Myers, 2009).

Secondary laboratories in the agriscience classroom are in need of modernizing assessment techniques that are suited for investigation and shift the focus away from only assessing if the student followed the correct procedure (Millar, 2004). Edwards, Luft, Potter, and Roehrig (1999) found that students learned more when they designed and carried out their own investigation. Emphasis can be shifted away from conducting experiments simply to try to develop the "correct" answer by: a) focusing on student-applied scientific concepts, b) explaining the methods of the experiment, and c) drawing clear conclusions from authentic results that are easily graded and provide feedback to the learners more quickly (NRC, 2006). A Vee map can offer solutions for this type of constructivist learning.

Thoron and Myers (2009) conducted a study that compared the Vee map and the laboratory report. In their study conducted with Florida introduction to agriscience students (n = 268) it was reported that there was a significant difference in student content knowledge achievement scores between groups. Students receiving the Vee map out performed their counterparts each time during the experimental counter-balance design. Thus, Thoron and Myers found the Vee map to have a positive impact on student content knowledge; however, further examination of additional variables could lead to better understanding how the Vee map impacts students based on gender, ethnicity, state standardized tests, grade, and social economic status.

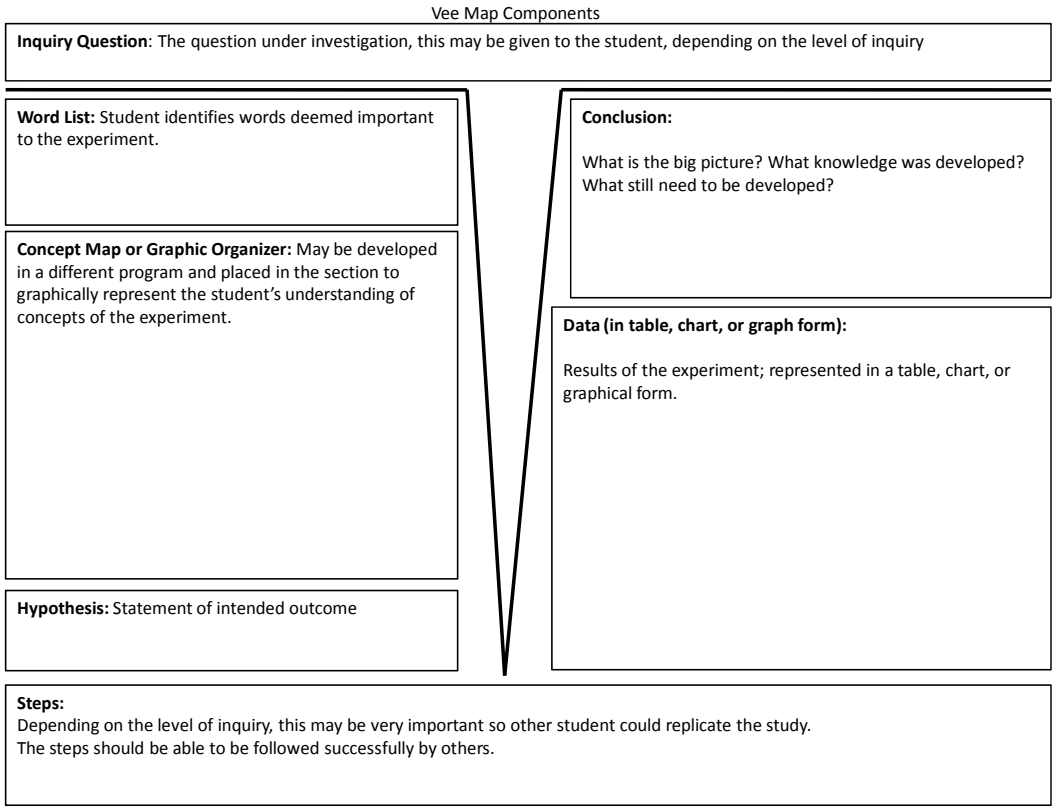

Figure 1. Vee Map Components.

Theoretical Framework

Ausubel's (1963) learning theory acted as a guide for this study. Ausubel places a central emphasis on learners' prior knowledge and the influence created on meaningful learning. "Meaningful learning results when a person consciously and explicitly ties new knowledge to relevant concepts or proposition they already possess" (Novak, Gowin, & Johansen, 1983, p. 625). Ausubel stated there is interplay between affective learning and cognitive learning and he built his theory for the meaning of each concept. Ausubel identified seven concepts along a continuum. Each concept builds on the previous that takes the learner from incorporation of information verbatim, to building knowledge and linking the relevant concepts together. As a result, learning becomes "less rote" and "more meaningful" through the planned instructional practice that supports learners. Novak (1980) stated that in order for learners to be successful in this theory the material must be inherently meaningful, the learner must link new knowledge with existing and relevant knowledge, and the learner must know relevant concepts involved in the scientific investigation. The Vee map provides the frame work that allows the learners to form the basis of Ausubel's learning theory as they develop success in meaningful learning when they develop the Vee map as a diagram of their thinking and process of experimentation. The Vee map provides a structure for students to exhibit their scientific foundation, investigate without following a laboratory verbatim, and have the ability to incorporate their previous knowledge.

America's Lab Report (NRC, 2006) outlined goals for laboratory experiences in educational settings. These goals served as the framework of the study. Goal one is to enhance mastery of subject matter. The study's objective was to compare the impact on content knowledge achievement of two different formative assessments in laboratory instruction. Developing scientific reasoning is another goal in the report. The Vee map is a tool specially designed to develop the scientific thinking skills of the learners (Gowin, 1979). Goal three is for students to exhibit connections between laboratory experiences and empirical work. The Vee map quantifies student experience through the use of graphic organizers and guides students to draw upon empirical data to form conclusions and recommendations. Finally, employing team work through laboratory investigations and asking student opinions of their utilization of the formative assessment tools bring all the goals outlined in the NRC report into this study.

Purpose and Objectives

The purpose of this study was to compare the impact of student demographic variables on student content knowledge achievement when using the Vee map as a formative assessment tool. The specific objectives guiding the study were to:

1. Determine the impact of gender on student content knowledge achievement when using a Vee map.
2. Determine the impact of ethnicity on student content knowledge achievement when using a Vee map.
3. Determine the impact of grade level on student content knowledge achievement when using a Vee map.
4. Determine the impact of social economic status on student content knowledge achievement when using a Vee map.
5. Determine the impact of a state standardized test on student content knowledge achievement when using a Vee map.

The null hypothesis, H_o: There is no significant difference in student content knowledge achievement based on gender, ethnicity, grade level, social economic status, and state standardized test when using the Vee map as a formative assessment tool.

Procedures

This study is part of a larger study conducted by Thoron and Myers (2009). Thoron and Myers reported the population of this quasi-experimental, counter-balance design study was composed of students at nine Florida high schools that offered agriscience education ($N = 291$). Each participating high school agriscience program was required to have two sections of introduction to agriscience. Schools were then purposively selected by a panel of experts on the capacity to integrate science into the curriculum. The Vee map is referred to as the treatment and the comparison (control) was determined to be the laboratory report. The order in which the intact groups received the treatment and comparison was determined randomly. Ary, Jacobs, and Sorensen (2010) stated that a counter-balance design is appropriate for use with intact groups. A counter-balanced design provides the ability to rotate out any differences that might exist between groups (Ary, Jacobs, & Sorensen, 2010).

Each student was administered a pretest to establish a base line before each replication to measure content knowledge in the subject matter being taught (soil science) and served as a covariate measure. All sections were taught the same subject matter content by the same teacher and taught using the same teaching techniques and methods. Control section participants completed the laboratory report outlined by Osborne (1994) in his text *Biological Applications in Agricultural Education* following the completion of a laboratory activity. Participants in the treatment group completed the Vee map. Following the data analysis procedure for counter balanced design suggested by Ary, Jacobs, and Sorensen (2010), column means were calculated for each treatment. Those means were then compared using a univariate analysis of covariance.

Pretest and posttest instruments were developed by the researchers using content knowledge questions in the form of thirty multiple choice items. The instruments contained a specific number of questions based upon the determined percentage of time to be spent teaching each objective of the unit. The testing instruments were validated by a panel of agriscience education experts from a state land grant university and were determined to be valid. The posttest questions were asked in a randomly selected order to reduce testing effect (Campbell & Stanley, 1963). Test–retest reliability was determined with a summated test score mean of 74.4 percent for test one and 63.6 percent for test two. Reliability coefficients for the knowledge level assessments were .99 and .99 respectively.

To help control for teacher variance, each school had a counter balance design and each teacher participated in a tutorial which explained teaching techniques, format and structure of the laboratory and Vee map reports. Upon completion of the tutorial, teachers received continuing professional development credit. Each teacher taught the selected lessons for four weeks. Researchers determined *a priori* that the intervention was not fully administered if a student missed 25% or more of instruction in the unit. Therefore, students missing more than four days of school during the study period were removed from the data set.

Twenty–nine students were removed from the study due to missing 25% or more of the instructional unit. Thus the original sample was narrowed to $n = 268$. All replications contained two lessons and before the lessons were taught a pretest was given to serve as a covariate to adjust for achievement prior to the treatment. Analysis for each objective utilized a covariate technique to analyze the data. Following the completion of data collection, posttest score means for each treatment, regardless of replication, were calculated (Ary, Jacobs, & Sorensen, 2010).

Findings

The first objective sought to determine the impact of gender on student content knowledge achievement when using a Vee map. The analysis of the data for this objective was guided by the null hypothesis that there is no significant difference in student content knowledge achievement based on gender. Following the first replication, males reported a posttest score of 69.03 (SD=16.65) on posttest 1 and females reported a posttest score of 64.43 (SD=17.99) on posttest 1 (See Table 1). This difference in posttest scores was found to not be statistically significant, $F(234.44) = 2.91$, $p = .09$. Following the second replication, males reported a posttest score of 63.42 (SD=17.99) on posttest 2 and females reported a posttest score of 67.91 (SD=16.59) on posttest 2. This difference in posttest scores was also found to not be statistically

significant, $F(234.25) = 3.49$, $p = .06$. No statistically significant differences were found in the replications, thus the null hypothesis failed to be rejected.

Table 1
Posttest scores of Vee map by gender (n = 268).

	Mean Test Score					
	Posttest 1			Posttest 2		
Gender	*M*	*SD*	*n*	*M*	*SD*	*n*
Male	63.43	17.99	157	69.03	16.65	157
Female	67.91	16.59	111	64.43	17.99	111

The second objective sought to determine the impact of ethnicity on student content knowledge achievement when using a Vee map. The analysis of the data for this objective was guided by the null hypothesis that there is no significant difference in student content knowledge achievement based on ethnicity. Following the first replication on posttest 1, black students reported a posttest score of 63.27 (SD=14.91), Hispanic students reported a posttest score of 65.88 (SD=18.35), white student reported a posttest score of 65.18 (SD=17.81), and students that self-identified as other scored 82.25 (SD=14.15) (See Table 2). This difference in posttest scores was found not to be statistically significant, $F(189.22) = 1.069$, $p = .36$. Following the second replication and completion of posttest 2, black students reported a posttest score of 67.84 (SD=16.99) on posttest 2, Hispanic students reported a posttest score of 65.05 (SD=15.44), white students reported a posttest score of 67.38 (SD=17.85), and students that were self-identified as other scored 71.25 (SD=20.14). This difference in posttest scores were found not to be statistically significant, $F(180.84) = 0.58$, $p = .63$. No statistically significant differences were found in the replications, thus the null hypothesis failed to be rejected.

Table 2
Posttest scores of Vee map by ethnicity (n = 268).

	Mean Test Score					
	Posttest 1			Posttest 2		
Ethnicity	*M*	*SD*	*n*	*M*	*SD*	*n*
Black	63.27	14.91	37	67.84	16.99	37
Hispanic	65.88	18.35	43	65.05	15.44	43
White	65.18	17.81	184	67.38	17.85	184
Other	82.25	14.15	4	71.25	20.14	4

The third objective sought to determine the impact of grade level (year in school) on student content knowledge achievement when using a Vee map. The analysis of the data for this objective was guided by the null hypothesis that there is no significant difference in student content knowledge achievement based on grade level. Following the first replication and submission of posttest 1, ninth grade students reported a posttest score of 65.91 (SD=17.19), tenth grade students reported a posttest score of 62.67 (SD=18.82), eleventh grade students reported a posttest score of 63.77 (SD=17.52), and twelfth grade students scored 73.64 (SD=14.10) (See Table 3). This difference in posttest scores was found not to be statistically significant, $F(229.17) = 1.28$, $p = .28$. Following the second replication and completion of

posttest 2, ninth graders reported a posttest score of 65.72 (SD=18.17), tenth grade students reported a posttest score of 70.09 (SD=14.99), eleventh grade students reported a posttest score of 69.46 (SD=17.91), and twelfth grade students scored 65.09 (SD=12.79). This difference in posttest scores were found not to be statistically significant, $F(217.34) = 1.75$, $p = .16$. No statistically significant differences were found in the replications, thus the null hypothesis failed to be rejected.

Table 3
Posttest scores of Vee map by grade (n = 268).

	Mean Test Score					
	Posttest 1			Posttest 2		
Grade level	*M*	*SD*	*n*	*M*	*SD*	*n*
9th	65.97	17.19	164	65.72	18.17	164
10th	62.67	18.82	58	70.09	14.99	58
11th	63.77	17.52	35	69.46	17.92	35
12th	73.64	14.01	11	65.09	12.79	11

The fourth objective sought to determine the impact of social economic status (SES), through the use of the school lunch program guidelines, on student content knowledge achievement when using a Vee map. The free and reduced school lunch program (FRSLP) was used as a proxy to SES based on the work of Stone and Lane (2003) and Merola (2005) that described linkage between SES and ability to participate in a state's FRSLP on student performance. The analysis of the data for this objective was guided by the null hypothesis that there is no significant difference in student content knowledge achievement based on SES. Following the first replication and submission of posttest 1, students not eligible to participate in the school lunch (reduced or free) program reported a posttest score of 65.32 (SD=17.61), students eligible to participate in the reduced school lunch program reported a posttest score of 73.20 (SD=13.18), students eligible to participate in the free lunch program reported a posttest score of 60.67 (SD=18.12) (See Table 4). This difference in posttest scores was found to be statistically significant, $F(253.83) = 5.434$, $p = .01$. Following the second replication and completion of posttest 2, students not eligible to participate in the lunch program reported a posttest score of 68.87 (SD=17.72), students eligible for a reduced lunch reported a posttest score of 69.73 (SD=14.17), and students eligible for a free lunch reported a posttest score of 61.70 (SD=17.15). This difference in posttest scores were found to be statistically significant, $F(239.96) = 3.29$, $p = .04$. Statistically significant differences were found in the replications; thus the null hypothesis was rejected.

Table 4
Posttest scores of Vee map by SES (n = 268).

Ability to participate in the lunch program	Mean Test Score					
	Posttest 1			Posttest 2		
	M	*SD*	*n*	*M*	*SD*	*n*
Not able to participate	65.32	17.60	158	68.87	17.72	158
Reduced lunch	73.20	13.18	40	69.73	14.17	40
Free lunch	60.67	18.12	70	61.70	17.15	70

The fifth objective sought to determine the impact of state standardized tests through the use of standardized assessment scores for reading, math, and science on student content knowledge achievement when using a Vee map. The analysis of the data for this objective was guided by the null hypothesis that there is no significant difference in student content knowledge achievement based on a state standardized test. Following the first replication and submission of posttest 1, students considered remedial readers reported a posttest score of 65.08 (SD=17.25), students not considered remedial readers reported a posttest score of 74.36 (SD=14.08), students in the same categories for posttest 2 scored 53.66 (SD=14.45) and 61.57 (SD=15.94) respectively (See Table 5). This difference in posttest scores was found to be statistically significant in both cases. Posttest 1 reported, $F(246.60) = 12.314$, $p = .00$, posttest 2 reported, $F(129.81) = 9.637$, $p = .00$ respectively (See Table 5). Statistically significant differences were found in the replications, thus the null hypothesis was rejected.

The state science score comparison of posttest 1 students remedial in science reported a posttest score of 67.54 (SD=16.74), students not remedial in science reported a posttest score of 75.03 (SD=13.78). This difference in posttest scores were found to be statistically significant, $F(171.01) = 3.72$, $p = .01$. The second replication and submission of posttest 2, students remedial in science reported a posttest score of 54.76 (SD=14.93), students not remedial in science reported a posttest score of 63.89 (SD=13.64). This difference in posttest scores were found to be statistically significant, $F(126.74) = 8.20$, $p \leq .00$. Statistically significant differences were found in the replications, thus the null hypothesis was rejected (See Table 5).

The state math score comparison of posttest 1 students remedial in math reported a posttest score of 68.00 (SD=18.78), students not remedial in math reported a posttest score of 71.71 (SD=13.09). This difference in posttest was not found to be statically significant, $F(234.29) = 3.39$, $p = .01$. The second replication and students' completion of posttest 2, students remedial in math reported a posttest score of 53.34 (SD=14.32), student not remedial in math reported a posttest score of 61.11 (SD=15.15). The difference in posttest was found to be statically significant $F(111.24) = 6.62$, $p \leq .00$. Statistically significant differences were found in one replication, thus the null hypothesis was rejected (See Table 5).

Table 5
Posttest scores of Vee map by SES (n = 268).

State Standardized test	Mean Test Score – Remedial						Mean Test Score – non remedial					
	Posttest 1			Posttest 2			Posttest 1			Posttest 2		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Reading	65.08	17.25	101	53.66	14.45	101	71.36	14.08	167	61.57	15.94	167
Science	67.54	16.74	173	54.76	14.93	173	75.03	13.78	95	63.89	13.64	95
Math	68.00	18.78	89	53.34	14.32	89	71.71	13.09	179	61.11	15.15	179

Conclusions and Recommendations

The Thoron and Myers (2009) study indicated that the Vee map, as a formative assessment tool, was more effective in the agriscience classroom when compared to the laboratory report. The Vee map is an interactive teaching/evaluation tool to be considered for classroom use. This study's results indicated the Vee map is not affected by gender, ethnicity, or grade level. However, this study does report a statistically significant difference in SES status. Further examination of the SES status revealed students receiving reduced lunch scored better during both replications. Students receiving free lunch scored the lowest each replication. The researchers suggest further examination of qualities reduced lunch students' posses in order to score significantly higher than their peers. Further investigation and consideration of the theoretical model guiding this study suggest emphasis on learners' prior knowledge and the influence created during meaningful learning (Ausubel, 1963). As Novak (1980) stated, in order for learners to be successful through the Ausubel theory the material must be inherently meaningful. Therefore, further investigation seeking knowledge if agriscience education and laboratories are more meaningful to students that qualify for reduced lunch status. Also, are students at lower socioeconomic status levels (eligible for reduced lunch program) bringing in more practical knowledge and able to apply it with a Vee map and the agriscience classroom? Further investigation may provide a link for student motivation in the classroom for students in this demographic.

Significant differences were found in reading and science when comparing remedial and non remedial learners. It can be concluded that the Vee map does not provide either remedial or non remedial learners with a significant advantage. Therefore, the Vee map may not aid in closing the gap that exists between the two groups. More importantly however, is the Vee map does not provide a disadvantage to students struggling to read. An assessment tool that assesses student knowledge construction of scientific principles an empirical data is the goal of the Vee map. A tool that assesses scientific measures and not reading ability is increasingly important. Furthermore, the examination of math scores reported mixed results and further investigation should be conducted.

Finally, this study does not provide evidence that the formative assessment tool provides an advantage over one group or another when based on grade, gender, or ethnicity. The United States Department of Education called for assessments that are research based and provide for measures that do not place an advantage on specific demographic groups (Anderson, 2002). The Vee map may be a way to motivate females and minorities to become enthused about science

and science experiments. Further investigation of student attitudes toward the use of Vee maps should be investigated.

Although this study has limitations based on a purposive selected sample, Vee maps should be considered a meaningful tool in the agriscience profession. Inservice and preservice teachers and teacher educators should examine this tool and consider it an effective way to assess experiments in the agriscience classroom. Baxter, Shavelson, Goldman, and Pine (1992) stated there is a dissatisfaction of current assessments, leading to a further developed need to reform curriculum and advance student thinking and understanding. This tool provides for better thinking when measuring student content knowledge achievement (Thoron & Myers 2009) and this study indicated it is unbiased based on gender, grade, and ethnicity. Shavelson, Baxter, and Pine (1991) stated that the educational research should focus on educational measures that go beyond correct responses to reports and focus on conceptual understanding, problem-solving, and application, the Vee map provides the profession with that avenue.

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Impact of Gender, Ethnicity, Year in School, Social Economic Status, and State Standardized Assessment Scores on Student Content Knowledge Achievement When Using Vee Maps as a Formative Assessment Tool

Discussant Remarks by Kim E. Dooley

When I taught high school science, 40% of our class time was conducted in the laboratory. Grading 150 lab reports each time resulted in grading overload. I found that lab reports were identical for lab partners and thus quickly learned I needed an efficient method for assessing learning. I incorporated collaborative, peer teaching with a group lab report. Students held each other accountable for the mutual report. I wish that I had been aware of this innovative alternative to formative assessment at that time. After reading your manuscript, I am convinced that this technique provides a reliable measure of learning in experiential settings.

The authors provided a thorough review of the literature and theoretical framework. Based upon the description of the Vee map, learners are challenged to work at a higher level of cognition. The constructivist approach allows students to make connections and application for a deeper transfer of learning. Educators often struggle with creation and use of assessment measures to capture learning; I could see the benefit and relevance of this study for both agriscience and science teachers.

The purpose and research objectives were clearly stated and appropriate for this quasi-experimental, counterbalanced design. Vee map technique was the treatment group and standard laboratory report was the control group. Pretest and posttest instruments were determined to be reliable. Including the alpha level for the test of statistical significance in the procedures would help to clarify results.

The findings were very interesting. There were no significant differences for the demographic variables for gender, ethnicity, and grade level. However, there was a difference based upon socioeconomic status. Comparisons of reading, science, and mathematics standardized test scores resulted in rejection of the null hypothesis. The authors emphasized the need for further investigation on these factors.

I thoroughly enjoyed reading this manuscript and look forward to the presentation of the results.

Secondary Agricultural Educators: How Prepared Are They To Provide An All Inclusive Learning Environment?

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Abstract

The purpose of this descriptive survey census study was to gauge the readiness of secondary agricultural educators throughout the United States to foster inclusive learning environments for all students as perceived by state directors and supervisors. Secondary agricultural education teachers were perceived to be prepared to serve women and socioeconomic diversity, but not ethnic minorities, learning style diversity, diversity of gender identification, religious diversity, and special needs populations. It was found that agricultural education is beneficial for ethnic minorities and women, but still there is a lacking by secondary agricultural teachers to handle these issues. Barriers to inclusion in secondary agricultural education were found to be guidance counselors, the perception of agriculture itself, the lack of role models, the lack of understanding student styles, and stereotypes. It was recommended that secondary agricultural education professionals receive preservice and inservice training in multicultural education and differentiated instruction, and that relationships be formed with school officials and the community in general in order to foster inclusion efforts.

Introduction

The United States has become more culturally and linguistically diverse (Faltis, 2006). Since the 1980's the population has grown at the rate of 9% per year, creating a significant increase Hispanic, Asian, Pacifica Islander, Native American, and multiracial populations (Files, 2005). These demographic changes have greatly impacted America's public schools, which has grown to an enrollment of over 50 million students, and contains multiple races, cultures, and other types of diversity (Feller, 2005). Given this factor diverse students are likely to experience conflicts if schools are not sensitive to their culture, language, family background, religion, sexual orientation, and learning styles (Short & Echevarria, 2005). When considering the teaching workforce in America is greatly European American (86%), female (75%), and middle-aged, many factors can affect the instructional environment, one of which is the communication channels between students and teachers that affect the development of inclusive learning environments (National Education Association, 2003). Given the fact 1 out of 4 jobs in America is agriculture related more emphasis needs to be placed on creating and implementing opportunities for inclusiveness through efforts of agricultural literacy.

One major area of inclusion that affects U.S. public schools is socioeconomic factors such as family type and family income. Over the past two decades the U.S. family structure has greatly changed due to facts such as high divorce rates, economic pressure requiring both parents to work, and welfare reform (Smith, Gartin, Murdick, & Hilton, 2006). Fewer than 50% of children live with both biological parents; furthermore, it is estimated that 59% of all children will live in a single-parent household before they reach the age of 18. With respect to income

according to the National Center for Children in Poverty in 2006, nearly 13 million children, or 17%, lived in families with incomes below the federal poverty level. The problem of poverty becomes even more pronounced when analyzing ethnicity (33% African American, 27% Latino, and 40% Native American). Students within the aforementioned categories can experience great academic problems for a variety of reasons (Fass & Cauthen, 2007).

There are various issues of concern teachers must realize when working with students from different social, cultural and ethnic backgrounds. When teaching students with a background other than their own teachers should make every effort to learn each student's unique background baring in mind that student's cognitive development is based on their learned experiences. Many secondary agricultural educators' social and academic expectations are greatly based on mainstream, middle-class culture to which they are experienced (Alston, English, Faulkner, & Hilton, 2008). In relation to learning style culture greatly impacts the way individuals process, organize, and learn material. Students from polychromic cultures may engage in many different activities, including talking all at one time, in contrast to monochromic cultures which may prefer working without talking. Another area of inclusion that more emphasis should be applied toward is students with disabilities. Mainstreaming and inclusionary practices have increased the number of students with disabilities in agricultural education programs (Cotton, 2000; Gagnon & Keith, 1988; Kessell, 2005; Schwager & White, 1994).

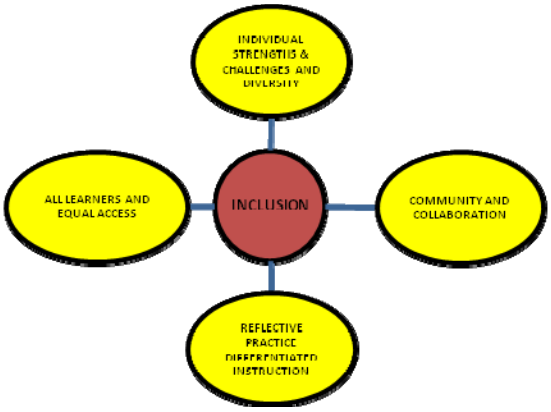
For teachers to be able to effectively instruct special needs students they should have a working knowledge of how to identify intervention methods and instructional methods. Prior studies by (Baggett, Scanlon, & Curtis, 1985; Baggett & Chinoda, 1994) indicated that agriculture teachers were deficient in the proper pre-service knowledge of how to teach special needs students. Consequent studies by Dormody & Torres (2002); Elbert & Baggett (2003); and Sorenson, Tarpley, & Warnick (2005) concluded that agriculture teachers are not competent in either how to effectively instruct special needs students nor possess an understanding of the Individuals with Disabilities Education Act. By changing the educators' attitude towards working with special needs students will assist in creating collaboration between all students thus decreasing classroom discipline (Cooper, Bocksnick, & Frick, 2002).

So the question is posed, how can secondary agricultural educators address the needs of all of the aforementioned populations in order to create inclusive learning environments? Is agricultural education prepared for the great demographic changes that are impacting American public schools?

Conceptual Framework

Inclusion is a philosophy that brings students, families, educators, and community members together to create schools and other social institutions based on acceptance, belonging, and community (Sapon-Shervin, 2003). Inclusion is based upon four major principles: 1. All Learners and Equal Access, 2. Individual Strengths and Challenges and Diversity, 3. Reflective Practices and Differentiated Instruction, and 4. Community and Collaboration.

Figure 1. Inclusion Conceptual Framework



Each of these major principles can be defined as follows:

1. ***All Learners and Equal Access*** emphasizes that effective inclusion improves the educational environment for all learners by placing them together in general education classrooms, regardless of their race, linguistic ability, economic status, sexual orientation, family structure, cultural and religious background, and learning ability (Roach, Salisbury, & McGregor, 2002).

2. Individual Strengths and Challenges and Diversity emphasizes sensitivity and acceptance of individual strengths and challenges and diversity. Diversity improves the educational systems for all students by placing them in general education environments regardless of race, ability, gender, economic status, gender, learning styles, ethnicity, cultural background, religion, family structure, linguistic ability, and sexual orientation.

3. ***Reflective Practice and Differentiated Instruction*** requires educators to examine their attitudes, teaching and classroom management practices, and curricula to accommodate individual needs. Educators must constantly evaluate their daily professional practice in order to optimize the educational learning environment for all of student clientele, regardless of their respective differences (Banks, 1994).

4. ***Community and Collaboration*** involves groups of professional educators, parents, students, families, and community agencies working together to build effective learning environments (Salend, 2008). Optimal educational environments involve collaborative efforts among all educational stakeholders in order to ensure that the greatest amount of learning can take place for all students (Banks, 1994).

Purpose and Objectives

The purpose of this descriptive survey census study was to gauge the readiness of secondary agricultural educators throughout the United States to foster inclusive learning environments for all students. To guide this study the following research questions were developed to determine:

1. What is the perceived level of preparation of secondary agricultural educators to foster an inclusive learning environment for various types of diversity?
2. What are the perceived benefits of inclusion in secondary agricultural education programs as viewed by state directors/supervisors of agricultural education?
3. What are the perceived barriers to inclusion in secondary agricultural education programs as viewed by state directors/supervisors of agricultural education?
4. What are the perceived solutions to facilitating inclusive learning environments in secondary agricultural education programs as viewed by state directors/supervisors of agricultural education?
5. What are the demographic characteristics of state directors/supervisors of agricultural education?
6. What are the demographic characteristics of agricultural education programming in the states under study?

Methodology

The population for this study consisted of all state Directors/supervisors of agricultural education (N = 52 – including Puerto Rico and the Virgin Islands) as provided by the National Association of Supervisors of Agricultural Education. A review of the sampling frame revealed at the time of data collection that three states did not have a director currently employed, thus reducing the sampling frame to N = 49. The survey utilized for this descriptive census study was adapted from a previous study conducted by Warren & Alston (2007). Modifications were made to specific sections of the survey in order to accommodate the research focus of this particular study, with one section being added in order to gauge agricultural teacher's level of preparation for fostering inclusive learning environments. The revised survey instrument for this study consisted of five sections: Part I. Benefits of Inclusion, Part II. Barriers to Inclusion, Part III. Proposed Solutions to Foster Inclusion in Secondary Agricultural Education, Part IV. Level of Preparation to Foster Inclusion in Secondary Agricultural Education, and Part V. Demographic and Program Characteristics. Parts I - IV consisted of Likert-type items; Part V consisted of a series of open-ended and multiple-choice items. Sections I - III consisted of ten questions each and utilized a five-point Likert-type scale with the following responses: 1=Strongly Disagree, 2=Disagree, 3=Uncertain, 4=Agree, and 5=Strongly Agree. Section four utilized the following Likert-type scale: 1 = Not Prepared, 2 = Somewhat Prepared, 3 = Undecided, 4 = Prepared, 5 = Very Prepared.

The validity of the instrument was originally established by means of content validity. Brown (1983) defined content validity as "the degree to which items on a test representatively sample the underlying content domain" (p 487). Brown recommended using expert judges as one means of establishing content validity. A panel of experts at North Carolina Agricultural and Technical State University consisting of researchers with experience in the area of inclusion reviewed the original instrument for content validity. The same panel of experts was asked to review the revised instrument for content validity. The instrument was judged to be valid in order to accomplish the specific purpose of this study. In order to establish the reliability of the revised instrument a pilot test was conducted upon randomly selected county level directors of career and technical education in North Carolina. The Cronbach's alpha reliability coefficients

for the sections of the survey were Part I: .88; Part II: .91, Part III: .85, and Part IV: .84, thus the instrument was deemed to be reliable. In relation to data collection a one week-interval, three-round data collection method was utilized following conventions established by Dillman (2009) for email surveys. The final response rate was 85% (N = 42). In order to control for non-response error, Miller and Smith (1983) recommended comparing early to late respondents. Upon completion of the study, an evaluation of the data showed that there were no significant differences found among the early respondents (respondents during the first round) and the late respondents (respondents after the first round).

Findings

Research Question One Findings

In Table 1 with respect to working with women and socioeconomic diversity it was perceived that agricultural educators are prepared. In contrast it was found that secondary agricultural educators were somewhat prepared to work with English as a Second Language (ESL) students. Moreover, respondents were undecided if secondary agricultural educators were prepared to work with individuals with learning disabilities, learning style diversity, special needs populations, diversity of gender identification, and ethnic minorities.

Table 1. Teacher Inclusion Preparation

Level of Preparation	Mean	SD
Women	4.20	1.030
Socioeconomic Diversity	3.59	1.224
Individuals With A Learning Disability	3.46	1.120
Learning Style Diversity	3.32	1.035
Special Needs Populations (Physical and Mental Disability)	3.10	1.091
Diversity of Gender Identification	2.90	1.429
Ethnic Minorities	2.83	1.181
Religious Diversity	2.66	1.132
English As A Second Language (ESL)	2.27	1.141

Scale: 1 = Not Prepared, 2 = Somewhat Prepared, 3 = Undecided, 4 = Prepared, 5 = Very Prepared

Research Question Two Findings

Table 2. displays the findings in relation to the perceived benefits of inclusion in secondary agricultural education. It was agreed upon by respondents that secondary agricultural education is beneficial for women and minority students in relation to their leadership and

character development. Moreover it was found that inclusion is beneficial for secondary agricultural education and FFA programs overall.

Table 2. Benefits of Inclusion

Benefits To Inclusion	Mean	SD
Secondary agricultural education provides women with the opportunity for character development.	4.68	.471
The inclusion of diverse populations in agricultural education is benefit for all agricultural education stakeholders.	4.63	.733
Inclusion broadens the perspectives of agricultural students.	4.59	.547
Inclusive learning environments cans sharpen students' critical thinking skills.	4.56	.594
Inclusive learning environments can broaden the perspectives of secondary agricultural teachers.	4.54	.552
Secondary agricultural education provides minorities with the opportunity for leadership development.	4.54	.596
There are many benefits for FFA programs which foster inclusive learning environments.	4.51	.553
There are many benefits for secondary agricultural education programs which foster inclusive learning environments.	4.49	.553
Secondary agricultural education provides minorities with the opportunity for character development.	4.46	.674

Scale: 2 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, and 5 = Strongly Agree

Research Question Three Findings

Table 3. provides the findings in relation to the perceived barriers to inclusion in secondary agricultural education programs. It was agreed upon that the lack of role models, the perception of agriculture itself, the lack of understanding a students' learning style, and stereotypes hinder the development of inclusion in secondary agricultural education. It was also agreed upon that guidance counselor are major barrier to inclusion in secondary agricultural education. In contrast to the aforementioned findings respondents were undecided if school administrators and the lack of training in special education were barriers to creating inclusive learning environments. Sexual harassment was perceived not to be a barrier to inclusion.

Table 3. Barriers to Inclusion

Barriers To Inclusion	Mean	SD
A lack of role models hinders the participation of minorities in agricultural education.	4.10	.735
The perception of agriculture itself influences the participation of minorities in agricultural education.	4.02	.724

The lack understanding a student's unique learning style can be a barrier in relation to creating an inclusive learning environment in secondary agricultural education.	3.93	.818
Guidance counselors influence the participation of ethnic minorities in agricultural education.	3.88	.900
Guidance counselors are barrier in relation to creating inclusive learning environments in secondary education.	3.66	1.039
The perception of agriculture itself hinders the development of inclusive learning environments within secondary education.	3.59	.921
Stereotypes are a primary reason why minorities do not enroll in secondary agricultural education.	3.51	1.052
A lack of training in special education hinders the participation of special needs populations in secondary agricultural education.	3.20	1.100
School administrators are a barrier in relation to creating inclusive learning environments in secondary education.	3.00	.975
Sexual harassment is a factor as to why women do not enroll in secondary agricultural education courses.	1.80	.901

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree

Research Question Four Findings

Table 4. displays the perceived solutions to fostering inclusion in secondary agricultural education. It was agreed upon that forming relationships within the local community, with advisory groups, and with guidance counselors were inclusion solutions. Furthermore it was perceived that preservice and inservice training in differentiated instruction and multicultural education were solutions to fostering inclusion. It was also agreed upon that school administrator support and content analysis of curriculum materials were solutions to fostering inclusive learning environments.

Table 4. Solutions to Foster Inclusion

Solutions to Foster Inclusion	Mean	SD
Guidance Counselor/Agricultural Education Teacher Partnerships in Recruiting and Retaining Students Into Secondary Agricultural Education Programs	4.29	.642
Secondary Agricultural Educators Forming Local Community Relationships With Diverse Groups	4.27	.549
Secondary Agricultural Education Program Inclusion Marketing Efforts	4.20	.601
Local Secondary Agricultural Education Advisory Group's Support of Inclusion	4.17	.738

School Administration Support For Agricultural Education Inclusion Efforts	4.15	.760
Inservice Teacher Training In Differentiated Instruction	4.10	.625
Preservice Teacher Training In Differentiated Instruction	4.07	.608
Inservice Teacher Training In Multicultural Education	3.85	.691
Content Analysis of Agricultural Education Curriculum Materials To Ensure An Inclusive Learning Environment	3.83	.771
Preservice Teacher Training In Multicultural Education	3.80	.715

Scale: 1 = Not Prepared, 2 = Somewhat Prepared, 3 = Undecided, 4 = Prepared, 5 = Very Prepared

Research Question Five Findings

In this study the majority of respondents were forty-nine years of age, white males who held a graduate degree. Additionally, respondents had taught secondary agricultural education for twelve years, had been a state supervisor for ten years, and lastly had taken almost ten hours of training in relation to inclusion within the past five years.

Table 5. State Supervisor's Demographics

State Supervisor's Demographics	N	Mean/Percentage
Age		49.33
Gender:		
Female	9	21.4%
Male	33	78.5%
Race/Ethnicity		
Black	1	2.4
White	38	90.4
Hispanic	2	4.9
Native American	0	0
Asian/Pacific Islander	1	2.4
Other	0	0
How many years did you teach secondary agricultural education?		12.23
Degree:		
Bachelor	4	9.5%
Master's	24	57.1%
Specialist	6	14.3%
Doctorate	8	19.0%
How many years have you been a state supervisor of agricultural education?		10.4
How many hours of training/professional development have you taken in relation to inclusion in the past five years?		9.5

Research Question Six Findings

Table 6. displays the demographics for state FFA/Agricultural Education programs. The majority of students enrolled in secondary agricultural education programs were white, followed

by Hispanic and black students. Additionally males comprised the majority of FFA members. The average FFA state membership was 7,698.

Table 6. State FFA/Agricultural Education Demographics

State FFA Demographics	Mean/Percentage
What is your state's current FFA membership?	7,698
State Agricultural Education Ethnicity:	
Black	4.6%
White	78.9%
Hispanic	8.1%
Native American	2.7%
Asian	1.0%
Other	4.5%
State FFA Ethnic Breakdown:	
Black	3.5%
White	78.6%
Hispanic	7.2%
Native American	2.4%
Asian	.57%
Other	4.2%
FFA Gender Breakdown:	
Female	39.2%
Male	60%

Conclusions

State directors of agricultural education agreed that secondary agricultural education was overall beneficial for ethnic minorities, but yet were undecided about the level of preparation that agricultural teachers have in working with this population. This finding can be directly tied to the low percentage of minorities that participate in secondary agricultural education in general. Given the influence that teachers have upon their respective instructional programs barriers such as the lack of teacher role models, the traditional image of the secondary agricultural education programs, and the understanding of student's learning styles can be changed by proactive, visionary agricultural education teachers. Respondents indicated that secondary agricultural education teachers are prepared to work with female students, and that sexual harassment is not a barrier for female agricultural education students, which can be directly related to their perception that secondary agricultural education is overall beneficial for female students. When considering that females currently hold over 50% of state leadership positions in FFA nationally, one could attest to the increasing presence of women, in what has been a traditionally male field.

When taking a student's socioeconomic status into consideration state directors indicated that secondary agricultural education teachers were prepared to work with this population. Given the fact that a great percentage of students enrolled in career and technical education programs nationally have traditionally come from lower income backgrounds, secondary agricultural education teachers have a long tenure in serving the educational needs of this

respective group. In contrast it was found that state directors were undecided about whether teachers are prepared to work with individuals with a learning disability and special needs populations. Respondents were also undecided if a lack of training in this area was a barrier to inclusion in secondary agricultural education, however it was recognized that not understanding a student's learning style was a barrier, and that training in differentiated instruction is needed. Given the aforementioned factors perhaps state directors are not fully aware of the impact that properly serving the unique needs of special populations could have upon secondary agricultural education, but yet recognize that something does need to be done to accommodate this sector of the student population.

It was also found that respondents were undecided about the preparation of secondary agricultural education teachers to service students with diversity of gender identification and diversity of religion. Perhaps teachers are not receiving enough preservice and inservice training in these areas, especially given the diversity of today's student population. Lastly, it was perceived that secondary agricultural educators are somewhat prepared to serve English as a Second Language (ESL) students. When considering the consistently increasing percentage of immigrants to the United States each year school systems and teacher education programs nationally are going to have reconsider how preservice and inservice education professionals are being trained in this area. Respondents perceived guidance counselors to be a barrier to inclusion in secondary agricultural education, but not school administration. Perhaps school administrators see the value of inclusion in secondary agricultural education, and are more supportive of the programs than guidance counselors.

Recommendations

Given the aforementioned findings, it is recommended that preservice and inservice agricultural education professionals receive training in differentiated instruction and multicultural education. As the number of culturally and linguistically diverse students increases and the number of students with disabilities swells, agricultural education professionals must have the ability to transform the classroom into engaging contexts where individual student needs are met. Having the ability to create "different avenues to acquiring content, to processing or making sense of ideas, and to developing products so that each student can learn effectively" (Tomlinson, 2001, p.1) will allow agricultural education professionals to transform teaching and learning in the classroom. With its focus on student centeredness, assessment, and proactive responsive individualized instruction, preservice and inservice agricultural education professionals will have the skills to shake up what occurs in the classroom to engage all learners. For differentiated instruction to occur, agricultural education professionals must first understand the various cultures, values, and beliefs present within their classrooms which requires intense, focused multicultural education training. Differentiated instruction requires the agricultural education professional to look at a classroom through many eyes which requires understanding various perspectives present within a classroom and understanding how to present information from multiple perspectives. Multicultural education prepares preservice and inservice education professionals to consider these perspectives while attending to issues of equity, prejudice reduction, knowledge construction, content integration, and student empowerment. If preservice and inservice agricultural education professionals are truly to engage learners so they may make

learning meaningful, relevant, and rigorous, enhancing their knowledge of differentiated instruction and multicultural education is a necessity.

To foster support for inclusion efforts, secondary agricultural educators should develop relationships with guidance counselors and school administrators to ensure they understand what agricultural education is and what the profession entails. Expanding their understanding of agricultural education may open the discipline to more students who may have interest in the profession. Secondary agricultural educators also must cultivate relationships with the local community. Preservice and inservice agricultural education professionals must utilize the resources available to them to make the learning process more engaging to diverse students. Building relationships with local youth councils, specific community groups that focus on select demographics (i.e., 100 Black Men), or community organizations like Boys and Girls Club, YMCA, 4-H, or church groups provides secondary agricultural educators with numerous avenues to educate the community about the profession or real-world sites to engage in agricultural-related activities.

Implications

The concept of diversity directly impacts the agricultural industry in the United States because the agricultural industry is not representative of the diverse population present within this country. In order for the United States to sustain its current agricultural rank, recruitment of a more diverse future workforce must be enhanced. The field of education and agribusiness as a whole must acquire an understanding of the motivational factors and rewards that would motivate or encourage diverse groups to pursue an agricultural career.

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Secondary Agricultural Educators:
How Prepared Are They To Provide An All Inclusive Learning Environment?
Thomas Dobbins

The issue found in this study, "How Prepared Are They to Provide an All Inclusive Learning Environment:" are difficult to address in survey research because many of these which may or may not be in the control of the teacher. You were able to build your case for this study through excellent sources. I would like to have read more sources in relationship to facts in your paper such as "1 out of 4 jobs in America is Agriculture". You also indicated that socioeconomic was a major area of concern. Students of poverty will always be a major concern.

In defining your Conceptual Framework, you were able to build on inclusion as a philosophy; however, I would have liked to read more current research that supports your CF.

In presenting your purpose and objectives, I found it very difficult to understand why you would use six research questions. It is very difficult to address two or three in a research paper. Sometimes we as researchers want our work to solve all the issues when we really would be better served by addressing a few issues at a time.

In your Method section, I found that you conducted a very detailed study. You explained your methods as well as your sampling frame and data collection in detail. My question in this section is why you selected "Directors/Supervisors of Agricultural Education?" What does this group add to your study? Does this group have the background or understanding of the Agricultural programs to address your research questions?

In your finding section, you constructed six tables which addressed your research question using mean and SD. My question to you in this section is "Do you think that means and standard deviation were able to frame your research question?"

In reading your conclusion, I found several areas that were red flags for me as an educator:

- What were your indicators for level of preparation that agricultural teachers have in working with ethnic minorities?
- "Given the fact that a great percentage of students enrolled in career and technical education programs nationally have traditionally come from lower income backgrounds, secondary agricultural education teachers have a long tenure in serving the educational needs of this respective group." Is this true for agriculture in relationship to the school?
- How would the respondent know about a student gender identification or religion background?

You never referred back to your tables to support your conclusions nor did you use any sources. It would have been very helpful for this study to have defined the conclusion in detail.

My questions:

- What did you learn from this study?
- What would you do different?
- What would you change in regards to research procedures?

Analyzing The Attitudes Of Agricultural Education Teachers On Diversity Inclusion In Secondary Agricultural Education Programs

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Abstract

S*econdary agricultural education teachers' attitudes about the perceptions of diversity inclusion in their programs are variables that may have a strong influence on the number of students that enroll in agricultural education courses. The purpose of this study, which was part of a larger study, was to determine if relationships existed among agricultural education teachers' selected demographic and personal characteristics regarding their perceptions of the benefits toward diversity inclusion, perceived barriers toward diversity inclusion, and proposed solutions to increase diversity inclusion in secondary agricultural education programs. Using a web-based questionnaire, the researchers employed a nonproportional stratified random sampling technique and 232 secondary agricultural education teachers participated in the study. Through comparative analysis, researchers found that statistically significant differences existed in teachers' perceptions toward the benefits of diversity inclusion, the perceived barriers toward diversity inclusion, and the opinions of proposed solutions to increase diversity inclusion in secondary agricultural education programs. Additional research should be conducted to understand better why these differences exist.*

Introduction

The National Council for Agricultural Education's strategic plan and action agenda states: "All students have access to seamless, lifelong instruction in agriculture, food, fiber and natural resource systems through a wide variety of delivery methods and educational settings" (National Council for Agricultural Education, 2000, p. 4). In order to fulfill this goal, the need to increase the diversity of our profession has become paramount. Although the agricultural education profession has made strides for diversity, we still have fallen short. Data on race/ethnicity and gender show that 88% of all agricultural educators are White with almost 64% being White male and 24% being White female (Kantrovich, 2007). In contrast, the general population of students of color reached 30% in 1990, 34% in 1994, and 40% in 2002 and will continue to increase throughout the 21st century (Hodgkinson, 1991, 2001, 2002; KewalRamani, Gilbertson, Fox, & Provasnik, 2007; National Center for Educational Statistics, 2007). As public schools become progressively more diverse, the need to recruit and retain students from diverse backgrounds is important. Loudenslager (2006) summed it up well:

> Agricultural education's record of attracting and serving a diverse student body is mixed at best. We have made great progress in gender and geographic (rural, urban and suburban) diversification. But, the goal of attracting and fully engaging all students of color and varied socio-economic means and locales has been elusive. (p.2)

Students with Disabilities in Agricultural Education

Since the inception of P.L. 94-142 and the reauthorization of the No Child Left Behind Act of 2002, the movement to include students with disabilities in regular education settings has become an important topic. The Individuals with Disabilities Education Act Amendments of 1997 (P.L. 105-77) require that students with disabilities have access to the general curriculum. The Carl D. Perkins Vocational and Applied Technology Act of 1990 (P.L. 101-392) mandates equal access to career and technical education for students with disabilities. The increasing number of children in regular education classes requiring different accommodations in the classroom has had a profound impact on the nature of teaching (Hayes, 2008). Because of this grouping, agricultural educators are faced with an important task of providing effective instruction that will address every student in the classroom. Elbert and Baggett (2003) concluded that "because programs have evolved toward mainstreaming disabled students due to legislation and various philosophies held by educators, most agricultural educators continue to feel less than competent while working with disabled students" (p. 113).

In order to address the changing demographics, the perceptions of diversity inclusion among agricultural educators must be examined. This is one of the first steps in ensuring that agricultural education teachers are prepared in terms of philosophy, pedagogy and curriculum to deal with the challenges of an increasingly diverse population.

Conceptual Framework

The conceptual framework guiding this study is based upon the concept of diversity inclusion. Diversity inclusion is an educational philosophy that welcomes all learners by actively engaging them in secondary agricultural education programs regardless of their race, ethnicity, or exceptionality. As a concept, diversity inclusion is based upon three constructing themes: inclusion, multicultural education, and culturally responsive teaching. To develop the conceptual framework, the authors conducted a review of the literature to identify emerging themes that could shed light on promoting and implementing a more inclusive atmosphere in agricultural education. The authors examined teacher perceptions of inclusion, multicultural education, and culturally responsive teaching.

Inclusion

Finegan (2004) conducted a study concerning teacher perceptions involving inclusion in general education classes. The researcher investigated identifying teacher perceptions about educating students with special needs, examining relationships between teacher perceptions and years of teaching experience, grade level, and type of institution in which the teachers were employed, and identifying beliefs about the critical issues involved in implementing inclusion. A total of 1,341 general and career and technology educators in grade levels Pre-Kindergarten through grade 12 were surveyed regarding (a) the extent of previous training received in working with students with disabilities and perceived needs for additional training, (b) the frequency of

communication between special and general education teachers, (c) the perceived helpfulness of suggestions given to general educators by special educators, (d) teacher participation in individualized education program team meetings and parent involvement in such meetings, (e) the provision of related services, and (f) teacher perceptions of their personal experiences with including students with disabilities in the general education classroom. The researcher discovered that public school teachers in Texas generally favor traditional special education service delivery models over full inclusive practices. Finegan (2004) also indicated that teachers perceive additional training, support from special education personnel and administrators, teacher communication and collaboration, and access to related services are necessary to meet the needs of their students with disabilities in the general education setting.

Multicultural Education

The history of multicultural education can be traced back to three prominent phases for which the roots of this entity started. The first phase of multicultural education can be linked directly to early ethnic studies scholars such as George Washington Williams, W. E. B. DuBois, Carter G. Woodson, Horace Mann Bond, and Charles C. Wesley (Banks, 1993). These originators were involved heavily in African- American scholarship and ethnic studies related to the other ethnic minority groups during the later part of the 19th century. The second phase of multicultural education began when educators, who were interested in ethnic studies, began to realize that by adding ethnic content into the school and teacher education curriculum, multicultural education would be critical in developing attitudes and perceptions of all people toward racial and ethnic studies (Banks, 1993). The third phase of multicultural education arose when other underrepresented groups, such as women and people with disabilities, demanded that their stories and struggles be included as well (Banks, 1993). Today, multicultural education is an educational reform movement that is geared toward creating equal and equitable school curriculums and structure for all students to learn about every race, ethnicity, culture, and lifestyle.

Culturally Responsive Teaching

Culturally responsive teaching is an educational process by which educators use cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students (i.e., students of color) to foster more relevant and effective learning encounters (Gay, 2000). Additionally, culturally responsive teaching teaches what Gay (2000) called *"to and through"* the strengths of ethnically diverse students. Villegas and Lucas (2002) asserted that to move successfully beyond the disjointed and superficial treatment of diversity that exists (in the field of teacher education), a systematically guided "infusion of multicultural issues" (p.21) must happen. This infusion process entails teacher educators to examine and assess the current curriculum and make the necessary revisions that will allow for a more diversity-centered approach. Villegas and Lucas identified six significant characteristics that define the culturally responsive teacher:

Such a teacher (a) is socioculturally conscious, that is, recognizes that there are multiple ways of perceiving reality and that these ways are influenced by one's location in the social order; (b) has affirming views of students from diverse backgrounds, seeing resources for learning in all students rather than viewing differences as problems to be overcome; (c) sees himself or herself

as both responsible for and capable of bringing about educational change that will make schools more responsive to all students; (d) understands how learners construct knowledge and is capable of promoting learners' knowledge construction; (e) knows about the lives of his or her students; and (f) uses his or her knowledge about students' lives to design instruction that builds on what they already know while stretching them beyond the familiar (Villegas & Lucas, 2002, p.21).

The Diversity Inclusive Program Model (see Figure 1) is an illustration that guides the concept of diversity inclusion. As previously mentioned, diversity inclusion encompasses multicultural education, inclusion, and culturally responsive teaching in a three-part model that highlights the critical infusion in which a diversity inclusive program should exist. Teachers and programs that exist within this area have positive perceptions about (a) the benefits of diversity inclusion; (b) understanding that, because of past perceptions, whether it be from students, teachers, or external factors (i.e., friends, coworkers, parents, etc.) pre-existing barriers may be reason why these particular students are underrepresented in agricultural education, and (c) having an awareness of possible solutions to increase underrepresented group participation in agricultural education. Additionally, teachers who are receptive to a diversity inclusive program have become allies to those who understand that the future success of agricultural education will be determined by how prepared our agricultural educators are in teaching students of color and students with disabilities in our classrooms. The over arching goal of the program model is to formulate an educational culture and classroom structure that all students, regardless of race, ethnicity, language, social class, physical, or mental ability, will experience social equity and equitable education.

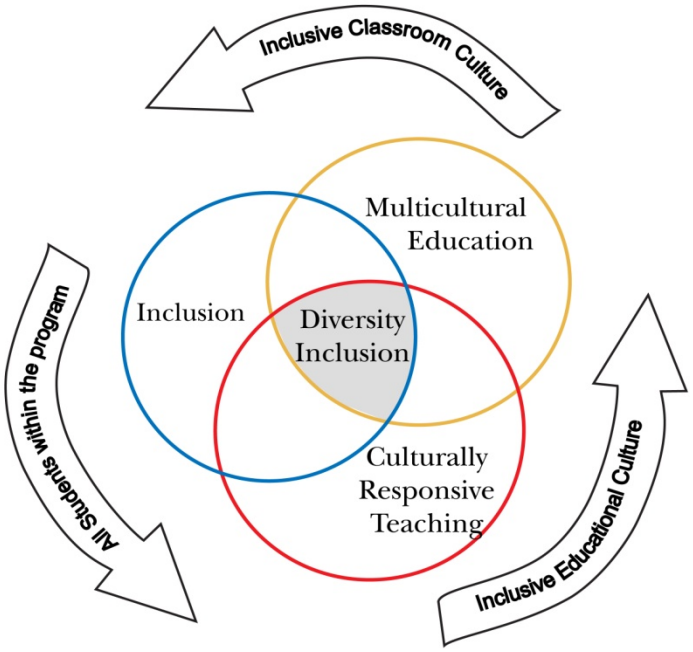

Figure 1. The Diversity Inclusive Program Model.

Purpose

The purpose of this study was to determine if relationships existed among agricultural education teachers' selected demographic and personal characteristics regarding their perceptions of the benefits toward diversity inclusion, perceived barriers toward diversity inclusion, and proposed solutions to increase diversity inclusion in secondary agricultural education programs. Based on consulted literature, the following hypotheses were developed to guide this study. The researchers set the alpha level *a priori* at $p < .05$.

Null Hypotheses

Ho_1: No difference exists in secondary agricultural education teachers' perceptions of the benefits of diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting.

Ho_2: No difference exists in secondary agricultural education teachers' perceptions of the barriers of diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting.

Ho_3: No difference exists in secondary agricultural education teachers' perceptions of proposed solutions to increase diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting.

Procedures

To address the purpose of this study and to test the null hypotheses, researchers employed a descriptive and correlational design. Gall, Gall, and Borg (2007) wrote "descriptive research, in quantitative research, is a type of investigation that measures the characteristics of a sample or population on prespecified variables" (p.638).

The target population consisted of all secondary agricultural education teachers listed by the Texas educational agency during the 2006-2007 school year ($N = 1,732$). Because of the lack of personal information listed by the Texas educational agency, access to the entire target population was not practical. Therefore, the accessible population consisted of all of the Texas agricultural education teachers that had email addresses listed on JudgingCard.com website. At the time of selection, 1,500 of the state's agricultural education teachers were listed. To promote validity and to ensure that all 1,500 teachers listed on the website were agricultural education teachers within the state, the researchers cross referenced the information with the Texas agriculture teachers association's membership roster. Of the 1,500 members who had email addresses on the website, all were members of the Texas agriculture teachers association during the 2007-2008 membership year.

Because of the size of the population and the inaccessibility to all agricultural education teachers in the state, the researchers used nonproportional stratified random sampling (Gall, Gall,

& Borg, 2007). However, judgments based upon the findings of this study should be made with caution especially when making generalizations to other groups of agricultural educators.

The researchers determined that all 10 administrative areas as defined by the Texas FFA Association would be represented equally in the study. Within each administrative area, 32 teachers were selected randomly among each Area (n = 320). The sample size was determined using a sampling formula from Bartlett, Kotrlik and Higgins (2001). This formula allowed the researchers to attain a practical sample size based upon a set alpha level *a priori* (.05), a set margin of error (5%) and a set estimate of standard deviation (1.17).

Survey participants completed a web-based, four-part questionnaire developed by the researchers and hosted on SurveyMonkey.com. The questionnaire was based on prior research by Warren and Alston (2007) concerning diversity and inclusion perceptions of North Carolina agricultural education teachers. Part one (*Benefits*) consisted of 12 statements designed to measure participants' perceptions toward diversity inclusion in secondary agricultural education programs. Part two (*Barriers*) of the questionnaire contained 12 statements designed to assess participants' perceptions on the perceived barriers to diversity inclusion in secondary agricultural education programs. Part three (*Solutions*) consisted of 12 statements designed to gauge participants' perceptions on possible strategies or solutions that would promote diversity inclusion in secondary agricultural education programs. Part four consisted of eight items designed to collect demographic information on the agricultural education teachers. Teachers responded to each question using a four- point, summated or Likert-type scale: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. The researchers used a four point scale to encourage participants to respond to the statements favorably or unfavorably. A panel of experts with expertise in diversity and inclusion established content and face validity. Construct validity was established through factor analysis. Reliability was estimated by calculating a Cronbach's alpha coefficient. The reliability analysis coefficients for the three constructs were *Benefits* = .75, *Barriers* = .73, and *Solutions* =.90.

With the popularity of the Internet and e-mail, digital research using e-mail or Web-surveys has become very common (Dillman, 2007). Ladner, Wingenbach, and Raven (2002) wrote: "Today, Web-based surveying has become a major information source for all researchers" (p. 41). One major weakness of web-based research is coverage error (sample population not having e-mail/internet access). This weakness was addressed because all public school teachers within the state have valid e-mail addresses through district websites and access to the Internet (Personal communication, 2008). Schonlau, Fricker, and Elliot (2002) wrote that Internet surveys should be considered when the target population is affiliated with an organization that provides an e-mail address.

On June 30, 2008, the researchers mailed a pre-notice/introductory letter to 320 agricultural education teachers. The letter explained the purpose and importance of the study and notified the participants that they would receive an e-mail with instructions on how to complete the questionnaire. At the time of the first e-mail, 31 e-mail addresses were invalid. The researchers searched district websites and contacted school personnel to obtain valid e-mail addresses. Once corrected, the e-mail was re-sent and deemed valid.

On July 7, 2008, the researchers sent the first notification e-mail to 320 agricultural education teachers. The notification letter served as an introduction to the study and the Internet link to the questionnaire. On July 10, 2008, a second reminder was sent via e-mail to the sample population. Because of the increased speed of web-based research, the time between the pre-notice letter and the initial questionnaire was reduced to days rather than weeks (Fraze, Hardin, Brashears, Haygood & Smith, 2003; Schaefer & Dillman, 1998). However, for the remainder of the data collection phase, the researchers sent reminder e-mails each Monday until the study was concluded on August 21, 2008.

Data were analyzed using SPSS® for Windows™ statistical package. Demographic characteristics were assessed using means, frequencies, and standard deviations. Hypothesis testing in this study was conducted using a series of independent samples t-test and Analysis of Variances (ANOVA). Analysis of Variances (ANOVA) was used to compare various subjects (independent variables) on scaled variables (dependent variables). If ANOVA was statistically significant, Tukey's post-hoc means test was used to determine which of the group means were different from others. To assess the magnitude of statistical differences, effect sizes were calculated, interpreted, and reported (Cohen, 1988).

Findings

During July 7, 2008 – August 21, 2008, 232 (72.5%) teachers responded. The researchers analyzed data for normalcy (SPSS procedure descriptive, explore) and determined that all data were usable (100%).

Non-response error was addressed by comparing participants who completed the questionnaire before the deadline (n =195) to those that completed the questionnaire after the closing date (n = 37) (Lindner, Murphy, and Briers, 2001). Table 1 shows that no statistically significant differences existed between respondents' mean scores on the three scales (*Benefits*, t (230) = 0.27, p <.05, r =.06, *Barriers*, t (220) = 0.06, p <.05, r = .00 *Solutions*, t (215) = 0.20, p <.05, r =.01) of the questionnaire.

Table 1
Early versus Late Response for the Three Constructs of the Benefits, Barriers, and Solutions Scales (n =232)

Scale	Returned Status	*n*	*M*	*SD*	*t*	*p*
Benefits	Early	195	3.35	.490	.267	.789
	Late	37	3.33	.460		
Barriers	Early	195	2.82	.368	.056	.955
	Late	37	2.83	.428		
Solutions	Early	195	2.91	.486	.199	.842
	Late	37	2.89	.491		

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.

Perceptions of agricultural education teachers on the *Benefits, Barriers,* and *Solutions* scales are shown in Table 2. The reliability analysis coefficient for the *Benefits* scale was .96, .75 for the *Barriers* scale, and .93 for the *Solutions* scale, respectively.

Table 2

Overall Mean Scores for the Benefits, Barriers, and Solutions Scales (n =232)

Scale	*n*	*M*	*SD*
Benefits	232	3.34	.484
Barriers	232	2.82	.378
Solutions	232	2.90	.485

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.

Null hypothesis one stated no difference exists in secondary agricultural education teachers' perceptions of the benefits of diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting. The personal characteristics were the independent variables. The dependent variable was the *Benefits* scale. This hypothesis was tested using a combination of independent samples t-test and the ANOVA procedure. Only those personal characteristics in which a statistically significant difference exists ($p < .05$) are reported.

Teaching Area

A one –way analysis of variance (ANOVA) was used to compare participants' perceptions of the benefits of diversity inclusion in secondary agricultural education programs by teaching areas of the state. As seen in Table 3, a statistically significant difference existed in mean scores among participants, $F(9, 206) = 2.31$, $p < .05$. A large effect size existed ($r = .92$). A Tukey's post-hoc analysis showed that Area 7 teachers ($M = 3.53$, $SD = .421$) had statistically significant higher mean *Benefits* scores than Area 9 teachers ($M = 3.04$, $SD = .637$).

Table 3

ANOVA Table of Overall Benefits Scores by Teaching Area (n = 232)

	n[a]	*M*	*SD*	*F*	*p*
Teaching Area					
1	13	3.49	.449	2.310	.017*
2	19	3.11	.348		
3	21	3.35	.417		
4	22	3.34	.486		
5	27	3.32	.500		
5	25	3.33	.414		
7	25	3.53	.421		
8	25	3.40	.519		

9	19	3.04	.637
10	20	3.50	.432

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.
[a] Sixteen participants chose not to respond to this question.
* $p < .05$

Because of statistically significant ($p < .05$) differences found between the personal variables, the null hypothesis was rejected, and the researchers concluded that a statistically significant difference existed in secondary agricultural education teachers' perceptions of the benefits of diversity inclusion in secondary agricultural education programs.

Null hypothesis two stated no difference exists in secondary agricultural education teachers' perceptions of the barriers to diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting. The personal characteristics were the independent variables. The dependent variable was the *Barriers* scale. This hypothesis was tested using a combination of independent samples t-test and the ANOVA procedure. Only those personal characteristics in which a significant difference existed ($p < .05$) are reported.

Race/Ethnicity

The researchers used the t-test procedure to determine if differences existed in the perceptions of the barriers to diversity inclusion based on race/ethnicity. For this analysis, participants who identified their race/ethnicity as Asian American, Black/African-American, Hispanic/Latino American, or Native American were coded as "yes"; participants who identified their race/ethnicity as White were coded as "no." Results indicate that a statistically significant difference (t (209) = 3.01, $p < .01$) existed between mean scores of teachers of color (M = 3.07, SD = .528) and White/European American teachers (M = 2.81, SD = .350) on the perceptions of the barriers to diversity inclusion in secondary agricultural education programs (see Table 4). A negligible effect size (r = .04) existed.

Table 4

Comparison of Barriers Scale by Teacher of Color Status (n =232)

Teacher of Color	n^a	M	SD	t	p
Yes	20	3.07	.528	3.010	.003**
No	191	2.81	.350		

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.
[a] Twenty one participants chose not to respond to this question.
** $p < .01$

Because of statistically significant (p <.05) differences found between the personal variables, researchers rejected the null hypothesis and concluded that a statistically significant difference existed in secondary agricultural education teachers' perceptions of the barriers to diversity inclusion in secondary agricultural education programs.

Null hypothesis three stated no difference exists in secondary agricultural education teachers' perceptions of proposed solutions to increase diversity inclusion in the presence of teaching area, age, gender, teaching experience, preservice diversity/multicultural training, inservice diversity/multicultural training, ethnicity, or school setting. Researchers tested this hypothesis using a combination of independent samples t-test and the ANOVA procedure. The personal characteristics were the independent variables. The dependent variable was the *Solutions* scale. Only those personal characteristics in which a statistically significant difference existed (p <.05) are reported.

Gender

Researchers used the t-test procedure to determine if differences existed in the perceptions of proposed solutions to increase diversity inclusion in secondary agricultural education programs by gender of participants. Results of the comparison show that a statistically significant difference existed by the category of gender, t (213) = 2.050, p <.05 (see Table 5). Females had a composite mean score of 3.04 (SD = .539) while males had a composite mean score 2.87 (SD = .463). A negligible effect size (r = .02) existed.

Table 5

Comparison of Solutions Scale by Gender (n =232)

Gender	n^a	M	SD	t	p
Female	45	3.04	.539	2.050	.042*
Male	170	2.87	.463		

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.
[a] Seventeen participants chose not to respond to this question.
* p <.05

Race/Ethnicity

Researchers used the t-test procedure to determine if differences existed in participants' perceptions of proposed solutions to increase diversity inclusion in secondary agricultural education programs based on race/ethnicity. For this analysis, participants who identified their race/ethnicity as Asian American, Black/African-American, Hispanic/Latino American, or Native American were coded as "yes"; participants who identified their race/ethnicity as White were coded as "no." Results indicate that a statistically significant difference (t (208) = 3.739, p <.01) existed between mean scores of teachers of color (M = 3.28, SD = .563) and White/European American teachers (M = 2.87, SD = .460) on the proposed solutions to increase diversity inclusion in secondary agricultural education programs (see Table 6). A negligible effect size (r = .06) existed.

Table 6

Comparison of Solutions Scale by Teacher of Color Status (n =232)

Teacher of Color	n^a	*M*	*SD*	*t*	*p*
Yes	20	3.28	.563	3.739	.001**
No	191	2.87	.460		

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.
[a] Twenty one participants chose not to respond to this question.
** $p < .01$

School Setting

Researchers conducted a one –way analysis of variance (ANOVA) to compare participants' perceptions of proposed solutions to increase diversity inclusion in secondary agricultural education programs by school setting. As noted in Table 7, the researchers concluded that a statistically significant difference existed in mean scores among participants, $F(2, 211) = .045$, $p < .05$. A negligible effect size existed ($r = .03$). A Tukey's post-hoc analysis revealed a statistically significant difference between the urban and rural school settings regarding mean scores of the *Barriers* scale.

Table 7

ANOVA Table of Overall Solutions Scores by School Setting (n =232)

	n^a	*M*	*SD*	*F*	*p*
School setting					
Rural	135	2.84	.417	3.147*	.045
Suburban	47	3.02	.550		
Urban	32	2.98	.571		

Note. Scale: 1.00 to 1.49 = Strongly Disagree, 1.50 to 2.49 = Disagree, 2.50 to 3.49 = Agree, 3.50 to 4.00 = Strongly Agree.
[a] Eighteen participants chose not to respond to this question.
* $p < .05$

Because of statistically significant ($p < .05$) differences found between the personal variables, researchers rejected the null hypothesis and concluded that a statistically significant difference existed in secondary agricultural education teachers' perceptions of proposed solutions to increase diversity inclusion in secondary agricultural education programs.

Conclusions, Recommendations, and Implications

The teaching area chosen by respondents had a statistically significant difference on the *Benefits* scale score. This finding indicated that Area 7 agreed more with the perceptions of the benefits of diversity inclusion than did Area 9 teachers. Results of this study also reveal that the racial and ethnic makeup of respondents had statistically significant differences among the groups. Teachers of color had higher mean scores than White/European American teachers on the *Barriers* scale. This finding indicated that teachers of color were more aware than did their counterparts of the barriers that influence students of color and students with disabilities not to enroll in agricultural education programs. Further knowledge of why these differences exist will determine what strategies will need to be implemented to ensure all agricultural educators understand the benefits of diversity inclusion in agricultural education programs.

Gender was found to show a statistically significant difference in mean scores on the *Solutions* scale. This finding indicated that females tended to agree more than their male counterparts with the proposed solutions to increasing diversity inclusion in agricultural education programs. This conclusion refutes the findings by Park (2004) which concluded that male teachers had statistically significant more positive attitudes about inclusive settings than did their female counterparts. This study also refutes the findings by Pearman, Huang, Barnhart, and Mellblom (1992) which reported that male teachers had a statistically significant higher amount of negative opinions about inclusion than did their female counterparts. Additional research should be done with male and female teachers to determine if personal or situational characteristics caused this difference to exist between the groups.

Teachers of color had higher mean scores than White/European American teachers on the *Solutions* scale. This finding indicated that teachers of color tended to agree more than did their counterparts with the proposed solutions to increase diversity inclusion in secondary agricultural education programs. Deliberate efforts should be made to examine why these differences exist. In order for agricultural education programs to maintain success, all agricultural educators will need to be on one accord in ensuring that the relevancy of recruiting students of color and students with disabilities is understood and emphasized.

A statistically significant difference existed between teachers who taught in an urban setting and teachers who taught in a rural setting on proposed solutions to increase diversity inclusion in secondary agricultural education programs. This finding indicated that teachers who taught in urban settings typically agreed more with the statements in the *Solutions* scale. Additional research of a qualitative nature should be conducted with agricultural education teachers to develop effective strategies to increase diversity inclusion in secondary agricultural education programs. Case studies involving successful inclusive programs could provide strategies and recommendations to other teachers as well.

Recommendations for future research should include replicating this study with similar populations to examine if differences exist among agricultural education teachers regarding diversity inclusion. In terms of teachers of color, very few were selected randomly among the sample population. Additional research should incorporate a stratified random sampling

procedure to ensure that respectable populations of certain subgroups within the target population are represented.

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Analyzing the Attitudes of Agricultural Education Teachers
On Diversity Inclusion in Secondary Agricultural Education Programs
Thomas Dobbins

This was a study that needed to be done and has great implication for the profession on how we view, understand, and define "diversity". This was a difficult paper to analyze because I assume it was part of a dissertation. You stated that: "The purpose of this study, 'which was part of a larger study' was to determine if relationships existed among agricultural education teachers' selected demographic and personal characteristics regarding their perceptions of the benefits toward diversity inclusion, perceived barriers toward diversity inclusion, and proposed solutions to increase diversity inclusion in secondary agricultural education programs." This becomes problematic because I am not sure if this is the purpose for the paper or the larger study. You used hypothesis to define your study. Was this because of the larger study? We, in Agricultural Education, are always trying to prove that our papers are of "hard" science quality. We at times use methods that are difficult to explain the "why" question when using hypotheses present problems such as was done for this study. My question here would be why not research questions?

You were able to provide a very interesting conceptual framework and used excellent sources to indicate the reason for this type of framework. However, this would have been an excellent opportunity to define diversity for this study. Sometimes we paint diversity with too broad of strokes. The Diversity Inclusive Program Model which is an excellent theory, not an easy model to implement or to show relationship because of its simple design but deals with complex issues.

In your procedure section, you did an excellent job of explaining the "why" of your procedures and also used excellent sources to add strength to the procedures. Using Survey Monkey is an excellent instrument to address many issues with IRB protocol. You also followed Dellman's procedures, which is always a great idea. I want to thank you for using a timeline which helped define your methods.

The findings section is very detailed and you used SPSS, which aids in consistency. However, you provided a lot of useful information that is hard to explain in a 12-page paper. When you supply several tables, you need to explain their meaning in detail.

In the conclusion section, I would have liked to read more in regards to "attitudes" defining meaning and how you would use statistically significant to add meaning to your study. I think sometimes we try to address too many factors in a study to really address the issues. My questions:

- What did you as a researcher find as a barrier to this study?
- How would you change our methodology?
- Would you use research questions in your next study?

A Comparison of Ethnicities in Perception and Behavior of Food Safety Practices in the Home

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Abstract

A national sample of food purchasers, and preparers completed an online survey in 2009 to the determine extent of their perception, and behaviors related to safe food practices in the home. There were a sample size of 413 respondents, 67.1% were female, and 32.9% male, ages from 65 to 18 years old. Among several characteristics, researchers identified household status, income, employment status, and type of area of residence. A descriptive needs assessment using Hershkowitz (1973) matrix analysis were used to identify level of needs for an educational program geared toward five constructs ,and a comparison of ethnicities were conducted. Results indicated low level needs for Caucasian and Minorities were adequate cooking, and avoiding foods from unsafe sources (constructs 4 and 5). No critical needs were identified for either group. Analysis which considered all ethnic groups revealed a critical need. Within the constructs several items were identified as areas for possible re-examination of re-entrenchment of educational materials. Results of this study can provide valuable information in terms of future considerations for educational materials development related to food handling.

Introduction

The Economic Research Service (ERS) has estimated 6.9 billion dollars per year are spent on food-borne illnesses while Centers for Disease Control (CDC) has estimated there are 76 million cases of food-borne illnesses annually, 325,000 hospitalizations and 5,000 deaths. These numbers bring to the forefront an overwhelming importance of prevention. According to Abbot, Bryd-Bredbenner, Schaffner , Bruhn, Blalock (2009) many persons may have perceived an outside organization as typically responsible for food-borne illnesses however, evidence has also suggested some blame stems from consumer's preferences (Patil S, Cates S, Morales, R.,2005) as well as, unsafe behaviors or practices within the household (Medeiros L, Hillers V, Kendall P, Mason, A. ,2001).

According to the National Restaurant Association, in professional settings there is evidence cultural differences can influence how people view food safety (ServSafe Coursebook, 2008). Thus, the researchers found it necessary to examine how demographics relate to food safety perceptions and practices. The National Research Agenda for AAAE (Osborne, 2007) indicated a research priority area within Agricultural Education in Domestic, and International Settings: Extension and Outreach is to ascertain the public's knowledge, views and openness

regarding the agri-food and natural resource system. This research falls within that goal. Additionally, Cummins (1986) made an argument for incorporation of culture, and language in educational programs as significant predictors of academic success. Similarly, it is believed incorporation of ethnic minority persons' culture, and language in career intervention programs will foster career development. Sarancho and Martinez-Hancok (2004) made a successful argument for the type of teacher-education curricula that develop —"cultural sensitivity, and a set of methods as well as techniques that can be applied to a variety of cultures" (p. 265). Furthermore, Sarancho and Martinez-Hancok (2004) made an argument of differences among Hispanic sub-groups and educational needs/experiences. Lopez-Quintero, Crum, and Neumark, (2006) discussed the importance of health related educational materials geared toward patients of all ethnic backgrounds, and considered Hispanic subgroups.

The creation of better designed educational materials could better communicate risks involved in consumption of risky foods,and lead to a more informed consumer along with reduction of related food-borne illnesses.

Conceptual Framework

Ramirez and De la Cruz (2003) concluded more than one in eight people in the United States are of Hispanic origin. In 2002, 40.2 percent (or 15 million) of the Hispanic population in the United States were foreign born, meaning 2 in 5 Hispanics are foreign born (Ramirez, de la Cruz,2003). Among the foreign-born Hispanic population in 2002, 52.1 percent entered the United States between 1990, and 2002, another 25.6 percent came in the 1980s, and the remainder (22.3 percent) entered before 1980 (Ramirez, de la Cruz, 2003). The next census will be conducted in April 2010. As the Census indicated, there is a changing demographic population makeup with some consistent trends in persons residing, and working in the United States. Mexican-Americans outnumber all other Hispanic sub-populations residing in the United States. Other Hispanic sub-populations educational attainment of a high school education is greater than Mexican Americans-this group is least likely to have obtained a high school education (Ramirez, de la Cruz, 2003).

While there are studies that have attempted to examine food safety handling on a basis of ethnic differences some have concluded-there are no differences among behaviors while others have shown-there are differences in what various ethnic groups will eat (for instance, beef and unpasteurized milk) (Shiferaw , Cieslak , The Food Group, Yang, Angulo, 2000; Patil (2005); Lin, C. J. (1995)). "As cited by Patil (2005) further research is needed on socioeconomic factors, and other population characteristics that could explain differences in safe handling practices, and risky food consumption habits by demographic categories as identified in this analysis." (p. 1893) and "furthermore in being aware of these differences can assist for better targeting risk communication efforts."

Medeiros L, Hillers V, Kendall P, Mason, A. (2001) pointed out food safety education is most likely to be effective if messages are directed toward a specific audience. An example as stated by Medeiros et al. (2001) is —"the incidence of campylobacteriosis being high among young men, and it has been postulated that the high incidence of *Campylobacter* infections in young men may be a reflection of their poor food preparation skills", (p.111). To reduce this risk, food safety education for young men should include information about cooking poultry

completely, and how to avoid cross-contamination during preparation of poultry products (Medeiros et al., 2001). Medeiros et al. (2001) mention —"Older people are more likely to consume raw or undercooked eggs than they are to partake in any other risky food related behaviors", (p.111). *Salmonella enteridtidis* infections are severe for the elderly, and this infection can be attributed to undercooked eggs (Medeiros et al., 2001). By comparison to adults children have a higher risk of serious complications, and infections from *Escherichia coli* O157:H7. This brings forth a need to address food education directed at parents of young children and childcare providers (Medeiros et al., 2001). Individuals residing in metropolitan areas reported higher consumption of raw or undercooked ground beef than did those in nonmetropolitan areas (Patil et al., 2005)

Numerous sources have stated that young adults often engage in unsafe food handling practices (Unklesbay et al., 1998; Bowman, 1999; Morrone and Rathbun, 2003; Haapala and Probart, 2004; McArthur et al., 2007; Abbot, et al., 2009), and this sub-population lacks vital food safety knowledge (Unklesbay et al., 1998; Endres et al., 2001; McArthur et al., 2007; Abbot, et al., 2009). With the exception of proper cooking, and heating, young adults had the poorest safe handling practices and were least knowledgeable about such practices (Patil, et al., 2005). Additionally, young adults believed it is not necessarily their primary responsibility to ensure food safety–rather responsibility falls on external organizations such as, health departments and restaurants (Abbot, et al., 2009; p.577).

Consumers in the high income (≥ $50,000) category had more widespread consumption of raw or undercooked ground beef, and shellfish compared with low (<$15,000), and middle ($15,000-$49,999) income groups (Patil, et al., 2005). Individuals with high incomes also were least knowledgeable about good hygiene practices, and practices to prevent cross-contamination (Patil, et al., 2005). Persons without a high school education reported lowest consumption of raw/undercooked beef, and shell fish, and reported safer handling practices compared to those with a high school education or more (Patil, et al., 2005).Yet, persons without high school had the least amount of knowledge of safe food handling practices (Patil, et al., 2005). Individuals with less than a high school education reported lower consumption of raw/undercooked beef, and shell fish than did individuals with a high school education or more. Individuals residing in metropolitan areas reported higher consumption of raw or undercooked ground beef than did those in nonmetropolitan areas.

While differences for behaviors among ethnicity were most apparent for consumption of raw or undercooked foods- African Americans reported lowest consumption of raw or undercooked foods, and Hispanics reported highest consumption of raw milk (Patil, et al., 2005). Mid-age adults consumed more raw or undercooked foods (except milk) than young adults and seniors (Patil, et al., 2005).

A majority of participants perceived foodborne illnesses were caused by food prepared from outside their home (Medeiros et al., 2001). However, evidence suggests from food preparation, 25% of reported outbreaks are due to inappropriate consumer food-handling, and preparation practices within the home (Anderson et al., 2004). These practices within the home are likely to contribute to food-borne illnesses (Anderson et al., 2004). The authors pointed out

this 25% may be an inadequate estimate since many persons may not report food-borne illnesses derived from within their home nor can they properly recognize symptom(s) of a food-borne illness (Anderson et al., 2004).

Purpose

Medeiros et al. (2001) study tested the knowledge of participants within the five constructs where as, the researcher's present study in 2009 considered knowledge, perceptions, sub-cultural groups, and program evaluation of needs of the curriculum. The purpose of this research conducted in 2009 was to closely examine potential cultural differences to include Hispanic sub-groups along with perceptions and behaviors of participants. In thesis research conducted at Texas Tech University, it is evidenced that food handling, and food processing practices within Mexico are different in comparison to the United States (Woolley, 2009). This may be due to lack of Hazard Analysis Critical Control Point (HACCP) certification or an unwillingness to adopt new practices that are contrary to Mexican culture. Individuals from Mexico or those individuals with close family ties in Mexico may be more likely to handle food in ways similar to their cultural upbringing.

Objectives

Medeiros et al. (2001) recommended five behavioral constructs to be addressed for food safety educational materials. These are similar to Centers for Disease Control risk factors: personal hygiene, adequate cooking, avoiding cross-contamination, cold-storage/hot holding, and avoiding foods from unsafe sources. Based on the Medeiros et al. (2001) constructs, and findings along with the literature review conducted for this current study of 2009-the researchers arrived at the following objectives to be considered for this study:

- Objective 1: Determine food handling practices based on demographic characteristics.
- Objective 2: Perceptions of safe food handling practices based on demographic characteristics.
- Objective 3: Determine critical needs of minority versus majority group.
- Objective 4: Determine relationships between critical needs of demographic groups.

Methodology

All data were collected in 2009. The research design for this study was a descriptive needs assessment using the Hershkowitz (1973) matrix analysis. Each question was plotted, and was used to determine the level of need of an educational program based on ethnicity. First, grand means for behavior, and perception were calculated for each ethnic group (all vs. Caucasians, vs. minorities) considering all five constructs simultaneously. Then, grand means for behavior, and perception with respect to each of the five constructs: personal hygiene, adequate cooking, avoiding cross-contamination, cold-storage/hot holding, and avoiding foods from unsafe sources were calculated. In all cases grand means were plotted as a horizontal, and vertical line on a —"X" and —"Y" axis of a graph resulting in four quadrants (see Figure 1). The four quadrants represent: Quadrant 1: Critical Need (CN) (high levels of behavior, and low levels of perception), Quadrant 2: Low Level Need (LLN) (low levels of behavior and perception), Quadrant 3: Low Level Successful Program (LLSP) (low levels of behavior and high levels of

perception), Quadrant 4: Successful Program (SP) (high levels of behavior and perception). The grand means were used as a base for comparison and defining where each quadrant was located. Each (X, Y) coordinate corresponded to each construct (Figures 2-4) while in Figures 5-9 refers to a specific subset question located in a construct. The location of each coordinate within a specific quadrant was an indicator of the type of program need (e.g. Quadrant 1: Critical Need (CN) (high levels of behavior and low levels of perception)).

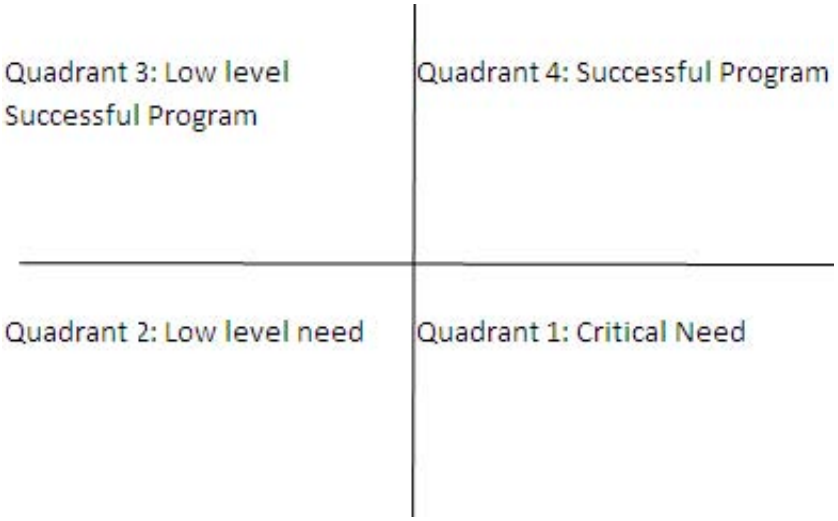

Figure 1. Matrix Analysis Quadrants- Hershkowitz (1973)

The four quadrants represent: Quadrant 1: Critical Need (CN) (high levels of behavior and low levels of perception, Quadrant 2: Low Level Need (LLN) (low levels of behavior and perception), Quadrant 3: Low Level Successful Program (LLSP) (low levels of behavior and high levels of perception), Quadrant 4: Successful Program (SP) (high levels of behavior and perception). The grand means are used as a base for comparison, and defining where each quadrant is located.

Population and Sample/Data Collection

The target population for this study was U.S. primary household grocery buyers. Researchers contracted with a third-party survey research company to perform data collection using their database of professional respondents. Target respondents were identified as a nationally representative sample of primary food purchasers and preparers for the household. Participants had to meet both requirements to be included. The instrument was provided to the survey company after pilot testing was conducted by the researchers nearly a month in advance from the official study. The third party company utilized its selected participants, and conducted the survey through the internet.

Instrumentation

The instrument used for this study was based on Medeiros et al. (2001). This instrument was adapted for use to gauge both perception and behavior. A pilot study was conducted and reliability coefficients were calculated on each of the five construct areas. Reliability was calculated following a pilot test consisting of 27 individuals. The calculation of reliability was performed using the coefficient alpha within SPSS. The Cronbach's Alpha for each construct was .87 for perception and .88 for behavior.

Data Analysis

All data that were collected were in Microsoft Excel and then transferred/evaluated in SPSS (version 16.0). Demographic information was found in a separate sub-section of the survey. For interval variables, the mean, and standard deviation were calculated. These included age, and all questions related to the five constructs. Frequencies were calculated on categorical variables. These included: gender, ethnicity, if a participant was the main meal planner of the household, type of residence(rural area-large city(>500,000 people), year born, if they were a citizen of the U.S., what their household status was (single adult-couple with /out children), employment status, highest level of education, number of hours worked outside the home, and estimated household income. Data for all five constructs, pertaining to perceptions, and behavior of food handling, were evaluated by calculating grand means (perception items plotted on the —"X" axis while behavior items plotted on —"Y" axis) and item means. Each question was plotted, and matrix analysis developed by Hershkowitz (1973) was used to determine level of need of an educational program geared toward specific constructs, and all groups vs. Caucasians vs. minorities.

Findings

In accordance with Krejcie and Morgan's (1970) sample size table, the survey company was asked to provide 386 respondents but actually received data from 413. Non-response was not considered a threat to external validity. The majority of the sample was Caucasian (83.5%) with the remainder of the ethnicities African American (4.1%), Asian American (4.6%), Native American (.2%), Other Non Hispanic (2.4%), and Hispanic (5%). The entire sample consisted of n=413 participants- 67.1% were female and 32.9% male. Frequencies were calculated on categorical variables. These included: gender, ethnicity, 84% of participants were main meal planners of the household while 16% were not.17.7% classified their place of residence as a rural area, 11.6% a town (500-2,500 people), 19.1% a large town (2,501-25,000 people),18.2% a small city (25,001-100,000 people), and 18.2% a large city (>500,000 people). The top 6 states of residence were: CA (19.6%), TX (8.5%), NY (7.3%), FL (6.1%), NJ (6.1%), NC (4.8%), other states accounted for 47.6%. 92% of participants were born in the United States while.5% were born in Puerto Rico, Guam, U.S. Virgin Islands/Northern Marians, while .7% were born aboard of American parent(s), 4.1% were a U.S. citizen by naturalization or other legal means, and 2.7% were not a citizen of the United States. The researchers excluded some data points on age due to participants not properly filling out this section. For the most part the researchers had an equal distribution of ages anywhere from 65 to 18 years of age, extreme values were excluded.

For Household status 28.6% respondents said they were a single adult, 6.5% single parent with child/children, 26.2% couple without children, 35.6% were couples with children,

and 3.1% with other household status. 10.7% were unemployed, 59.3% employed, 12.6% homemakers, 13.6% retired, and 3.9% were students. 43.3% said they worked 0-10 hours per week outside the home, 8.7% (11-20 hours), 10.2% (21-30 hours), 20.6% (31-40 hours), 13.6% (41-50 hours), and 3.6% (more than 50 hours). 9.7% responded their total household income was <15,000, 16% (15,000-29,999), 18.4% (30,000-44,999), 17.2% (45,000-59,999), 14% (60,000-74,999), 9.4% (75,000-89,999), 5.1% (90,000-105,000), and 10.2% (>105,000). 1% had less than a high school education, 1.9% some high school, 15% had a high school diploma/GED, 4.8% technical school, 29.5% some college education, 8% associate's degree, 25.2% bachelor's degree, 12.8% master's degree, and 1.7% a doctoral degree.

Results relating to Objectives 1 and 2: Determine food handling perceptions and behaviors based on demographic characteristics.

The sample was asked to rate the importance (perception), and activity (behavior) related to 23 food safety handling items in five constructs suggested by Medeiros et al. (2001). The tag line for importance items stated "How important is it to…" The responses were recorded on a 7-point, Likert-type scale with 1 representing —"Not at all important" and 7 representing —"Extremely Important". Behavioral items were similarly rated on a 7-point, Likert type scale with a tag line of "How often do you…" Their responses were recorded with 1 representing "Never" and 7 representing "Always". The results of all the questions are presented in Table 1.

Table 1

Mean Scores of Safe Food Handling Perceptions and Behaviors by Ethnicity

Constructs and Questions	Perceptions			Behaviors		
	Caucasian	All Minorities	Overall	Caucasian	All Minorities	Overall
Construct 1. Personal Hygiene						
Q1. Wash hands thoroughly before preparing or consuming food?	6.58	6.57	6.58	6.46	6.53	6.47
Q2. Wash hands thoroughly after playing with a pet and before getting a snack?	6.49	6.68	6.52	6.27	6.60	6.32
Q3. Wash hands thoroughly after handling raw eggs, raw meat, raw chicken, or raw seafood?	6.75	6.72	6.75	6.64	6.65	6.64

Q4. During preparing or consuming food that you wash your hands after touching your eyes, mouth or nose?	6.30	6.43	6.32	6.00	6.21	6.03
Construct 2. Adequate Cooking						
Q5. When cooking fish, checking that the flesh flakes easily with a fork before serving?	5.80	5.75	5.79	5.65	5.54	5.63
Q6. Use a food thermometer when cooking meat, poultry or fish?	4.84	4.94	4.85	4.36	4.34	4.36
Q7. Cook eggs till both the yolk and white are firm?	4.94	5.22	4.98	5.17	5.18	5.17
Q8. Make sure your hamburger is cooked well done?	5.21	5.75	5.30	5.23	5.78	5.32
Construct 3. Avoiding Cross Contamination						
Q9. Wipe off counter tops with a soapy dishcloth after having put a package of raw eggs, raw meat, raw chicken or raw fish on the counter top?	6.41	6.35	6.40	6.38	6.34	6.38
Q10.Wash a plate that was used to hold raw meat, poultry, or seafood with hot, soapy water before returning cooked food to the plate?	6.69	6.57	6.67	6.67	6.49	6.64
Q11. Wash all items that came in contact with raw eggs, raw meat, raw chicken, and raw seafood (e.g. Cutting board, knife, mixing bowls for batters, and counter top) with hot, soapy water before continuing cooking?	6.53	6.34	6.50	6.40	6.28	6.38
Q12. Keep raw eggs, raw meat, raw chicken, raw seafood and utensils that were used in	6.61	6.44	6.58	6.53	6.34	6.50

preparing these food items away from all vegetables that will not be cooked?						
Construct 4. Cold/Hot Storage Holding						
Q13. Put a carton of eggs into the refrigerator right after coming back from the store?	6.26	6.26	6.26	6.50	6.26	6.46
Q14. Refrigerate Cooked Rice within 2 hours of preparing or serving?	5.28	5.34	5.29	5.58	5.29	5.53
Q15. Refrigerate Fried Chicken within 2 hours of preparing or serving?	5.86	5.47	5.80	5.93	5.49	5.85
Q16. Refrigerate Refried or Cooked Beans within 2 hours of preparing or serving?	5.33	5.60	5.38	5.69	5.47	5.65
Q17. Refrigerate Ready to Eat foods (hot dogs, deli meats, washed and cut fruit and vegetables) immediately after coming back from the store?	6.21	6.10	6.19	6.41	6.13	6.36
Construct 5. Avoiding Foods From Unsafe Sources						
Q18.Use the microwave on defrost setting to defrost frozen meat, frozen chicken or frozen fish?	4.54	4.50	4.53	4.44	4.03	4.37
Q19. Use the refrigerator to defrost frozen meat, frozen chicken or frozen fish?	5.42	5.40	5.41	5.36	5.31	5.35
Q20. Drink only pasteurized milk?	5.69	5.59	5.67	6.10	5.66	6.03
Q21. Purchase oysters from health approved suppliers?	5.31	5.44	5.33	4.97	5.29	5.02
Q22. Throw away any food that is	5.74	6.03	5.79	5.81	6.10	5.86

past an expiration date?						
Q23. Keep household cleaners away from open containers of food?	6.46	6.35	6.44	6.54	6.44	6.52

Note. Perceptions 7-point scale (1=not at all important, 2=low importance, 3=slightly important, 4=neutral, 5=moderately important, 6=very important, 7=extremely important)
Behaviors 7-point scale (1=never, 2=rarely true, 3=sometimes but infrequently true, 4=neutral, 5=sometimes true, 6= usually true 7=always true)

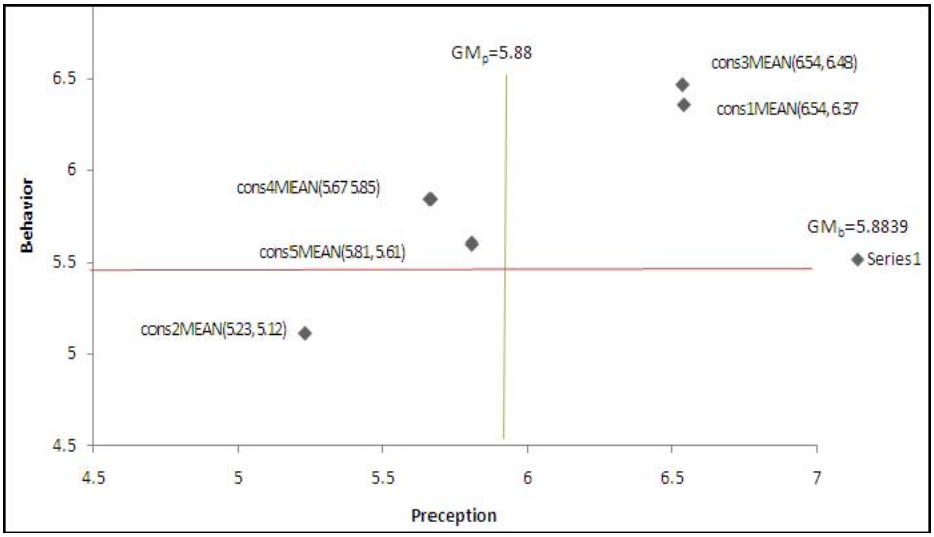

*Figure 2.*Determination of critical needs by construct of all groups (this includes both groups Caucasian, and Minority respondents). In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

Results relating to Objectives 3 and 4:
Determine critical needs of minority versus majority group.
Determine relationships between critical needs of demographic groups.

The sample was separated by ethnicity for further analysis. All minority populations were combined to generate adequate representation for each sub-group. The results of the matrix analysis for each ethnic sub-group can be seen in Figures 3 and 4.

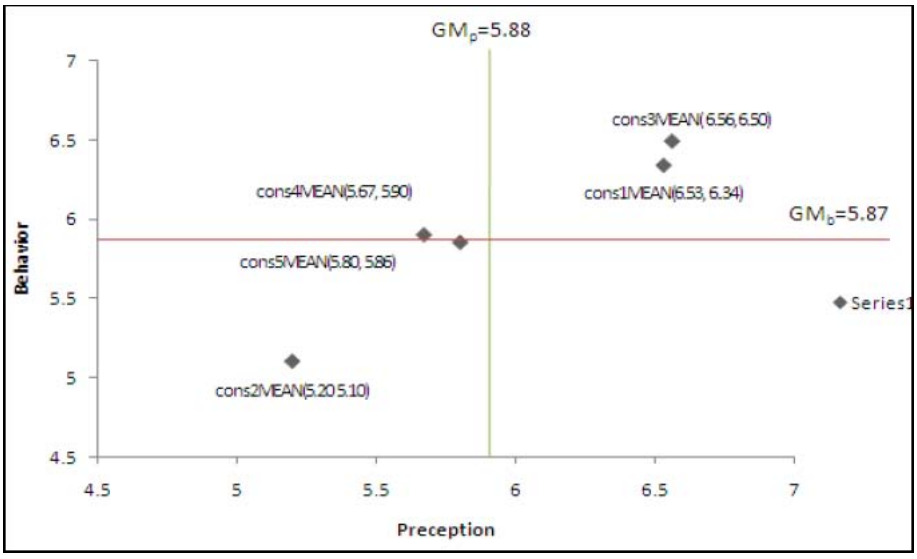

Figure 3. Determination of critical needs of Caucasian respondents by construct.
In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

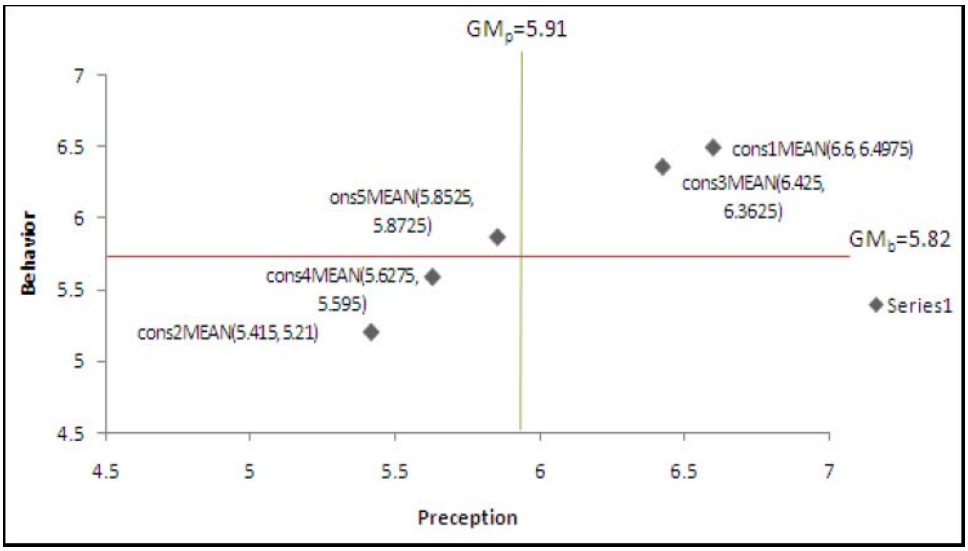

Figure 4. Determination of critical needs of minority respondents by construct.
In this figure all constructs are represented: 1) personal hygiene, 2) adequate cooking, 3) avoiding cross-contamination, 4) cold-storage/hot holding, and 5) avoiding foods from unsafe sources.

All figures 2, 3, and 4 indicated that constructs 1 and 3 are identified as successful programs while constructs 2 and 5 are low-level needs. Construct 4 was identified as a low-level successful program. Since neither group were determined to have a critical need, and the other need categories were identical, item analysis were limited to the entire population rather than

analysis of each sub-group. Results of the item analysis within each construct are presented in Figures 5-9. Question labels coincide with question labels in Table 1.

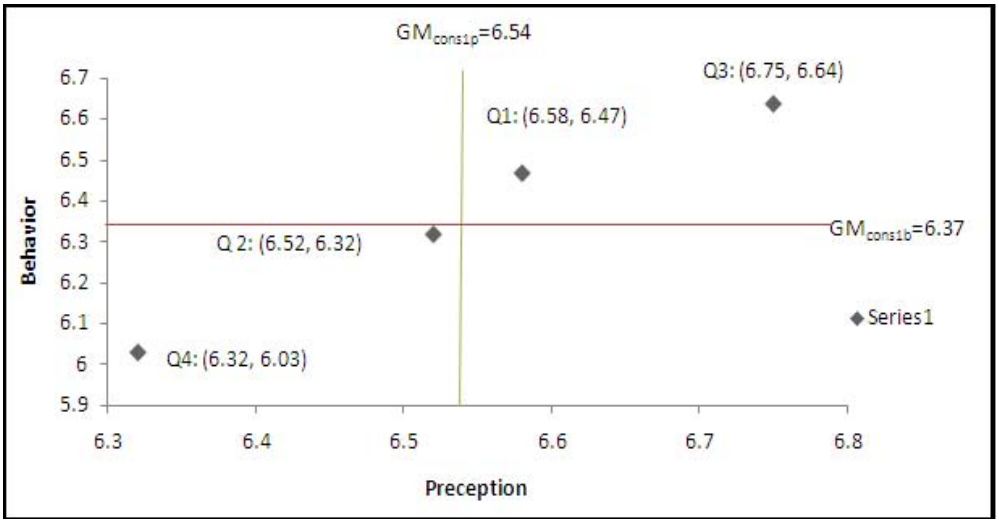

Figure 5. Determination of Critical Needs in Personal Hygiene (Construct1).

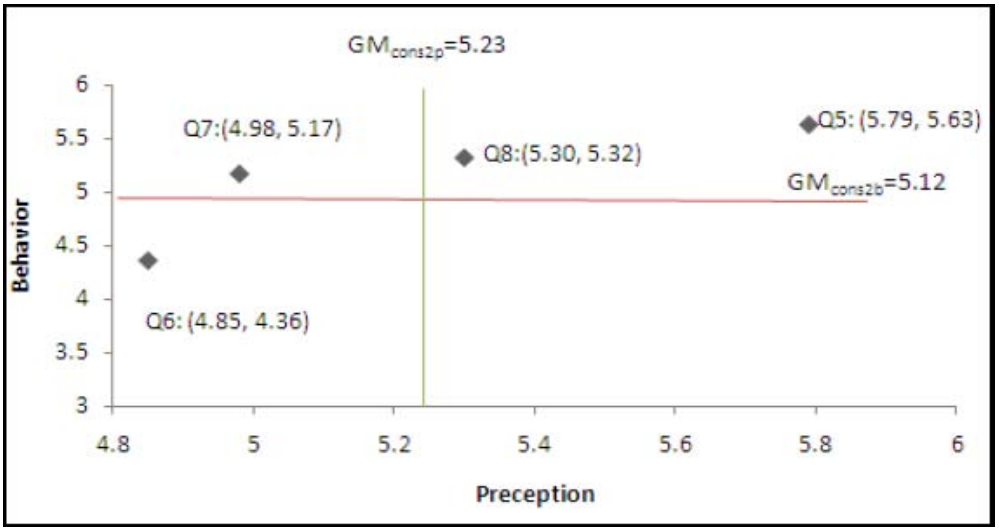

Figure 6. Determination of Critical Needs in Adequate Cooking (Construct2).

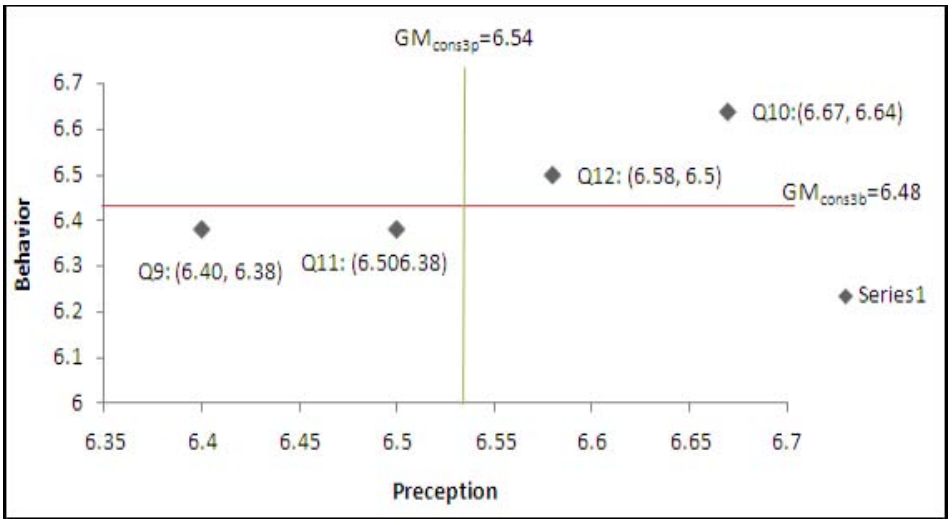

Figure 7. Determination of Critical Needs in Avoiding Cross Contamination (Construct3).

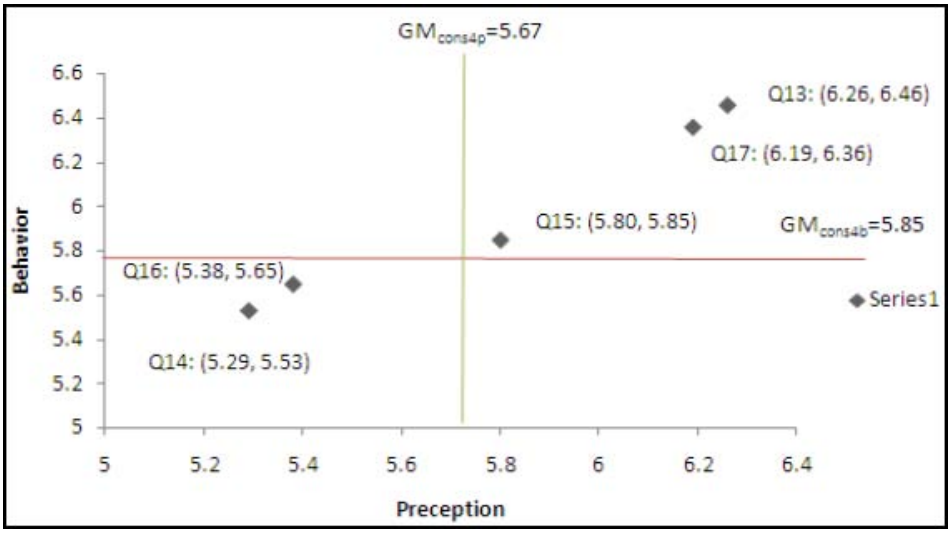

Figure 8. Determination of Critical Needs in Cold-Storage/Hot Holding (Construct4).

Figure 9. Determination of Critical Needs in Avoiding Foods from Unsafe Sources (Construct5).

Conclusions

Figures 5-9 demonstrated some very important findings in identifying successful programs as well as programs which needed later action to the point of re-entrenchment.

Personal hygiene (Figure 5) Question 1 and 3 proved no critical needs exist, and only requiring a monitoring for excellence. While Question 2 and 4 showed a low level need quadrant requiring it to be a secondary priority for later action.

Adequate cooking (Figure 6) showed no critical need for Questions 8 and 5 in quadrant 1 an indication of a successful program. However, Question 6 produced a low level need which should be a secondary priority for later action. Question 7 was a low level successful program, and should be re-examined for re-entrenchment of education material.

Cross contamination (Figure 7) questions 10 and 12 showed to be a successful program only requiring monitoring for excellence. Questions 9 and 11 showed a low level need requiring later action.

Cold/Hot storage/ holding (Figure 8) Questions 13, 15, and 17 indicated a successful program (monitoring for excellence is required) while Questions 14 and 16 are low level and showed a need for later actions. Questions 18, 19, 21 are of low level needs for later action. Questions 20 and 22 indicated a low level successful program, and should be re-examined for re-entrenchment of education materials.

Avoiding food from unsafe sources (Figure 9) showed a critical need with Question 23. Thus this area should be a 1st priority for program improvement.

The researchers were unable to detect any distinct differences among all Groups vs.

Caucasians vs. all Minorities. It is possible the small percentage of minority respondents in this study may have contributed to a lack of detectable differences. The results of this study showed education of personal hygiene, and avoiding cross contamination were being effectively taught, and the researchers should continue with current educational practices, and monitor this program for excellence. This 2009 study pointed out that a second priority should be considered-adequate cooking which would require educational materials addressing the behavior/ perception of food safety education in regard to the preparation of foods. Also, cold storage/hot holding falls into this category of the requirement for the need of educational materials addressing safe handling of food storage practices. The researchers discovered cold storage/hot holding, and avoiding foods from unsafe sources should be examined to the degree of re-entrenchment of educational materials. Avoiding food from unsafe sources showed a critical need. The researchers concluded this should be a 1st priority for program improvement.

Recommendations

This research provides evidence that dissemination of educational materials should be equally effective for all ethnicities. On the basis of construct factors-the researchers recommend developing educational materials which better target keeping household cleaners away from food; as this was identified a critical need among all groups. There is more work to be done to improve the perception and behaviors of food safety. The construct areas of concern for secondary priority in ensuring targeted food safety materials that need to be better addressed are-adequate cooking, cold-storage/hot holding, washing hands after playing with a pet, and then getting a snack, during preparation/consumption of food if a person washes their hands after touching their eyes, nose or mouth, and the use of a food thermometer, if they wipe off counter tops after putting raw eggs, meat, fish, on a counter top, refrigeration of rice or cooked beans within 2 hours, use of a microwave or refrigerator on defrost to defrost potentially hazardous foods, and purchase of oysters from approved food suppliers. While this study indicates an entire construct does not necessarily bring forth concern, within each construct there are areas of low level needs leaving further room for improvement in educational materials development. It is recommended these areas of specific low level needs be more closely addressed in future curriculum.

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A Comparison of Ethnicities in Perception and Behavior
Of Food Safety Practices in the Home
Thomas Dobbins

This was very interesting reading for a research paper, but one that, in my opinion, raises more questions than provides solutions. The researcher does a great job in building a case for the research. You were able to use current research to build your case and form a conceptual framework for this study.

In the purpose of your study you stated, "… closely examine potential cultural differences to include Hispanic sub-groups along with perceptions and behaviors of participants". Then you stated that within Mexico food handling processes are different in comparison to the United States because of HACCP certification. Do you think that the US really understands HACCP?

I would like to complement you on your methodology section. You described, in detail, how you conducted this research project. However, the findings were very problematic for me:

- You stated that the survey company was asked to provide 386 respondents but you received 413. How many surveys were sent out? What was the actual response rate?
- According to research, we need to be more concerned about food safety within families of lower income. Fifty six percent of your surveys were from families that had an income of > $45,000.00. Only 9.7% of the survey was from families recognized as below poverty line.
- Eighty four percent of your respondents were Caucasian. How can you do a comparison of ethnicities with such a high percentage from one group?

I found your charts well organized and they indicated that people in general have safe food practices at home. I did, however, find myself perplexed with the result in line with stated purpose.

My questions:
- How will you change this study to make it a valid study?
- Were there problems that occurred in this study that skewed the results? If so, what were these problems?
- Did the survey company do what they were contracted to do?

Effective Teaching: An Investigation of Award Winning Faculty Instructors

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Stacy K. Vincent, *University of Missouri*
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Abstract

The purpose of this phenomenological study was to describe the phenomena of effective teaching for award winning faculty instructors at The University of Missouri. Nine university faculty members were selected to participate in this study based on their recognition as award winning instructors and by a nomination from their respective college's academic dean. Each participant took part in a semi-structured interview with a member of the research team. After analysis, several themes were identified and fell into two broad categories dealing first with the act of effective teaching and second, the act of becoming and evolving as an effective teacher. One sub-theme was the need to focus on students. While all acknowledged the importance of course content, they noted that if the focus is not on the student, content is of little consequence. Additionally, sub-themes indicated that effective teaching required dialogue, was relevant and lead to critical thinking and progression which caused students to think about content in a new way. Further, themes describing teaching as scholarship and teaching and learning being a process of growth emerged. These themes provide valuable insight into how award winning faculty instructors think about their teaching.

Introduction and Conceptual Framework

Higher education in modern times is facing scrutiny from stakeholders regarding not only the value of the curriculum being taught as well as the quality of classroom teaching. Over the past two decades, higher education in general and the college classroom in particular has shifted (Huber & Hutchings, 2005). While it is commonly and often intuitively known among many college teachers that the general culture, needs, and level of preparation of the entering college student has changed (Choy, 2002), shifts have also occurred in the number and nature of subjects taught in higher education (Huber & Hutchings, 2005). Sweeping changes in the student population, the content offered, and general concern for teaching as a serious intellectual endeavor in higher education have been met with a shift in faculty focus and concern about pedagogy (Lindholm, Astin, Sax & Korn, 2002; Stewart, 2009).

Research on teaching and teacher effectiveness can be divided historically into two different approaches (Cruikshank, 1990). Prior to 1960 the bulk of the research conducted regarding teacher effectiveness centered on characteristics or traits exhibited by teachers and then deemed exemplary by administrators or those charged with evaluation of teacher performance (1990). Following this phase, a shift toward identifying specific traits and behaviors indicative of effective teaching became the dominant research focus in the literature on pedagogy (1990).

Rosenshine and Furst (1971) identified eleven different performance criteria related to teacher effectiveness and while their results provided insight into many variables related to effective teaching, they incited little direction to those charged with the responsibility of teaching content. While the Rosenshine and Furst literature has been widely utilized in teacher education programs in agriculture as the model of effective teaching, its use in modern teaching and learning environments is widely debated. Additionally, one must question if these traits are applicable nearly 40 years later, particularly in a *university* classroom that is much different than the settings described in the studies that Rosenshine and Furst used to identify these traits.

More recently, studies have been conducted to identify common practices among highly effective teachers. In one such study, 92 elementary and middle school teachers were followed over the course of a year (Bransford, Darling-Hammond, & Lepage, 2005). While the teachers participating in this study varied greatly on several different variables, the traits and elements of effective teaching that were identified were similar among all participants. Traits such as setting clear expectations for students, working the room while teaching, encouraging communication between student and teacher as well as between students, and having a clear organized plan were some of the key effective teaching characteristics identified (2005). While potentially useful at the postsecondary level, Menges and Austin (2001) argued that there are distinctive differences between education at the K-12 level versus postsecondary education. They noted the differing roles and missions between the two as well as the fact that university faculty, while highly trained in their respective fields, often have little if any training in teaching (2001). These are only two of the numerous distinctions that the authors draw between the two, thus the need for direct inquiry at the postsecondary level regarding effective teaching techniques.

Within the discipline of agricultural education specifically, studies on teaching effectiveness have examined teachers of agriculture at the secondary level (Larsen, 1992; Miller, Kahler, & Rheault, 1989; Newcomb, Warmbrod & McCracken, 1993; Roberts & Dyer, 2004). Additionally, agricultural education provides sound research in the cognitive levels of college teaching (Whittington, 2009; Lopez & Whittington, 2001; Bowman, & Whittington, 1994) and the needs and current levels of critical thinking (Ricketts, Rohs, & Nichols, 2005; Rudd, Baker, & Hoover, 1998) that are possessed at the college level. Yet, missing from the literature is a focus on effective teaching in agricultural sciences and related disciplines at the postsecondary level. This lack of literature, coupled with research priority area three of the Agricultural Education in University and Postsecondary Settings section of the *National Research Agenda: Agricultural Education and Communication 2007-2010* (Osborne, n.d.) helps to create an argument for the need to further investigate effective teaching at the postsecondary level.

Bransford, Darling-Hammond, and Lepage (2005) outlined a framework for organizing and understanding teaching and learning, that suggested that to be an effective teacher one must have a solid base and expertise in three broad areas. Effective teachers must have a knowledge of their students development as learners, a sound understanding of the subject being taught, and finally a knowledge of teaching (2005). It can be reasonably assumed that university faculty have a solid understanding of their respective content area. However, most have little or no formal education or training in pedagogy or learning psychology. Despite this, faculty are expected to provide instruction and many do so with great success and are identified by their students and peers as being exemplary teachers. Boyer (1990) stated that "teaching begins with

what the teacher knows…Pedagogical procedures must be carefully planned, continuously examined, and relate directly to the subject taught" (Defining SoTL Hand-out, 2008). This process may seem very logical to those with formal training in teaching, however, do effective college teachers describe a similar approach? With this in mind the researchers sought to determine what exemplary teaching means to award winning faculty at the University of Missouri.

This study was conceptualized through the lens of research on teaching, learning, effective teaching, and how teachers learn to teach. It was posited that, while faculty by and large have no formal training in pedagogy, the goal for learning to teach and subsequently becoming an effective teacher, is to develop habits of mind to approach teaching as an intellectual inquiry in both their own teaching effectiveness as well as within the literature on teaching. Four kinds of research bases to support teaching and learning have been noted in the teacher education literature including: research on how people learn, the influences of teaching strategies on what and how people learn, research on teacher professional development that influences student learning, and finally research that examines how teachers learn to teach in ways that support student learning (Darling-Hammond & Bransford, 2005). Specifically, this study posited that to clearly define the phenomenon of effective teaching at the college level, one must investigate how teachers *successfully* learn to teach in ways that support student learning.

Exemplary teaching is rewarding and acknowledged by some as scholarly (Evans & Tress, 2009; Shulman, 2000). In fact, Shapiro (2006) posits that effective teaching should be taken more seriously in the promotion and tenure process. The academic literature outside the realm of education journals documents the positive results of exemplary teaching, yet it is acknowledged that more guidance toward effective teaching in the areas of faculty development is needed. For example, the literature in the disciplines of medicine (Fincher, 2000); animal science (Buchanan, 2008); and psychology (Marsh & Roche, 1997) all call for a more codified knowledge base on effective teaching as well as faculty development efforts to help faculty implement effective practice. Furthermore, research (Hutchings, 2000) notes that a need is present in the overall profession of college teaching and in the improvement of student learning. An opportunity awaits agricultural educators in filling a need for training and examining the process of effective teaching at the post-secondary level, and faculty members in agricultural education as teacher educators can be positioned to lead the charge, not only their colleges but university wide, in developing faculty for effective practice in teaching.

It can be posited that faculty instructors who are recognized for their teaching are performing at highly effective levels in the classroom. As a result, it is increasingly important that the phenomena of effective teaching be understood from the viewpoint of these award winning instructors to provide direction to current and future faculty as to how they might improve their teaching effectiveness. In fact, researchers claim that some investment in time and attention to developing skills in teaching is likely to have substantial payoffs in self-satisfaction and effectiveness in a career (McKeachie & Svinicki, 2006). Further, a study of expert and novice teachers found that experts were more likely to be able to identify tasks that were important to the teaching process and were more likely to consider the consequences of their actions in the classroom (Berliner & Carter, 1989). In addition, expert teachers differed from their novice counterparts in their willingness to share their expertise when the opportunity

presented itself (Shim & Roth, 2009). If these clear distinctions exist between expert and novice teachers then should not more research be conducted in regard to what it means to be an exemplary or effective teacher? Additionally, previous study sought to examine effective teaching from the viewpoint of undergraduate students and indicated that these students identified six categorical turning points that define the effective teacher (Docan-Morgan, 2009). While informative in its own right, perhaps the best sources for this inquiry is not undergraduate students but rather, those teachers who have been deemed to be exemplary.

Purpose and Central Question

The purpose of this study was to describe the phenomena of effective teaching for award winning faculty instructors at the University of Missouri. The central question that guided this research was "What does it mean to award winning instructors to be an effective teacher?" Additionally, the following sub-questions were developed to further guide the development of the study and the analysis of the data collected. The sub questions were:

1. How do award winning teachers characterize a person who exemplifies the term effective teacher?
2. What do award winning teachers do inside and outside of the classroom that make them effective? What don't they do?

Methods and Procedures

Sample

A purposive sample of nine University of Missouri faculty members (5 male, 4 female) served as the participants for this study. The researchers selected these participants in order to ensure that attempts could be made to represent the various colleges at the university and to have an adequate number of individuals who shared the phenomena. The participants represented five different Colleges with three faculty from the College of Agriculture, Food and Natural Resources and the College of Liberal Arts and Sciences respectfully. The College of Business, College of Education, and the School of Journalism were each represented by one faculty participant. According to Polkinghorne (1989) it is suggested that between 5 and 25 individuals comprise the sample for a phenomenological study. While demographic characteristics were not a criterion, the following characteristics were observed. The participants represented various disciplines in the bench sciences, social sciences, and liberal arts and all taught at least one undergraduate course. Five of the participants held the rank of full professor with the remaining four holding the associate professor rank.

Research Design

According to Creswell (2007), a phenomenological study "describes the meaning for several individuals of their lived experiences of a concept or phenomenon" (p. 57). In conducting this study the researchers followed the process outlined by Moustakas (1994). Philosophically, the researchers were guided by the four philosophical perspectives in phenomenology as outlined by Stewart and Mickunas (1990).

When completing a phenomenology it is the researcher's intent is to gain a deeper understanding of a particular topic. To accomplish this, the researcher must first set aside their own beliefs and experiences with the phenomena of interest. Through a process called bracketing the researcher acknowledges their current understanding of the phenomena as well as any preconceived notions or biases they may hold in order to be open and receptive to the data collected and the resulting themes identified regarding the phenomena (Colaizzi, 1978; Creswell, 2007). As former teachers and current university personnel working in teacher education it was important for the researchers to bracket their experiences. As part of this process the researchers discussed their personal views regarding teaching and the characteristics of an effective teacher. This process served two purposes, first, it allowed each researcher to acknowledge the thoughts and views that they currently held and second, the differences between each researchers own views helped to highlight the fact that people have different views and different ways of expressing them. This helped to prepare the researchers for the interview process and allowed them to be much more open and receptive to the participant's responses and the resulting themes.

Procedure

Upon receipt of exempt status from the University Institutional Review Board, potential participants were contacted by the researchers and asked to participate in the study. The following criteria were used to select those faculty who were potential study participants. First, the researchers did an exhaustive review of faculty members who teach undergraduate courses at the university and had been recognized for the excellence in teaching with multiple teaching awards. Those individuals who had won at least two awards for their teaching beyond the departmental level were considered potential study participants.

Following creation of this list, the researchers contacted the Associate Dean for Academic Programs for each of the University's respective colleges and asked them to nominate faculty members whom they felt were the best undergraduate teachers in their programs. This request resulted in 62 individual faculty from across several disciplines. The researchers then created a list of faculty who met the criteria of being award winning and also received a nomination from their college's academic dean. At this point the researchers generated a list of 20 faculty who met all of the inclusion criteria. Based off of this list a group of ten faculty members was created to serve as the participants for the study. While selecting this list the researchers attempted to select faculty from various colleges and departments representing the bench sciences, social sciences, and the professions.

Those faculty who met all criteria and were selected as the participants for the study were sent an email by the research team briefly explaining the study and asking if they were willing to complete an interview of approximately one to one and one half hours in length. From this initial call six faculty indicated their willingness to participate. For those who declined, the research team selected a replacement from the 20 faculty members who met all of the inclusion criteria and asked them to consider participating. This process was repeated with nine total faculty members agreeing to participate in the study.

For each interview conducted the researchers first obtained informed consent from each faculty participant. After consent was obtained a semi structured interview protocol was utilized. To begin the interview participants were asked to do the following: "Describe an outstanding teacher. What makes this educator outstanding?" Although a set of questions were included in the protocol, it was the researchers intent to let the faculty participants drive the interview, only asking specific questions to direct or guide the participating faculty member toward various topics. Each interview was recorded using a digital recording device and then transcribed verbatim. Interviews ranged from 40 minutes to one hour and 40 minutes in length. At the conclusion of each interview the participants were thanked for their time and asked if they were willing to be contacted again if any clarification by the researcher was needed during transcription and data analysis.

Data Analysis

Recurring statements were identified after several readings of the interview transcripts. Based off of these reoccurring statements themes were developed and transcripts were coded by hand using highlighter markers with each theme coded by a different color. Throughout the process the researcher adhered to the phenomenological method, making every effort to maintain rigor by completing a thorough review of the literature, bracketing personal views and experiences, conducting interviews that resulted in data saturation, and then utilizing member checks to confirm the identified themes (Creswell, 2007). All participants were provided with copies of the interview transcripts and were asked to confirm their accuracy. The researchers also provided each participant with the finished manuscript and asked them for confirmation and approval of the stated findings. Additionally, an audit trail, reflexive journals, and peer debriefing were utilized to maintain trustworthiness and credibility of the qualitative data analysis (Denzin & Lincoln, 2005). While every effort was made to maintain the trustworthiness and credibility of the study, it should be noted that the findings are limited to the nine faculty members studied and readers should use caution when transferring these findings to other contexts (Lincoln & Guba, 1985).

Results

As stated previously, the purpose of this study was to describe the phenomena of exemplary teaching for award winning faculty instructors at the University of Missouri. A thorough review of the data collected during the interview process resulted in the identification of two major themes and several common subthemes. The two major themes identified helped to categorize the participant's responses into subthemes connected to the act of effective teaching and the act of becoming and evolving as an effective teacher. These themes and subthemes emerged after repeated readings of the interview transcripts and are not presented in any particular order.

The Act of Effective Teaching

The first major theme that was identified dealt with subthemes centered on the actual act of being an effective teacher. Common across all participants was the need to focus on students. Additionally, participants indicated that effective teaching required dialogue and was relevant.

Finally, effective teaching meant helping students develop thinking skills and causing them progress from their current level of knowing to some new level of understanding.

Focus on students.

Participants in this study were adamant that in order to be effective a teacher must place the student as the central focal point in thinking about teaching. Faculty suggested that one of the biggest mistakes that ineffective teachers make is that they focus on the content first rather than first focusing on the students. This does not mean that faculty deemed the content as unimportant; rather it meant that regardless of how important the message, if one has not first considered the students' needs, a teacher has little chance of reaching the student in the first place. According to one participant, "If you are not thinking in terms of how can I help the students understand the material you've got a huge barrier to get over."

In placing students as a central focal point in thinking about teaching, the teacher must have an understanding of the student audience. Faculty members indicated that they must have some idea about who the student body is as a whole, and at the same time recognize that the group is changing, and that students are very likely much different from the kinds of learners they were in college. One participant described the differences between how today's students learn versus how the participant learned. They stated:

> … when they are thinking about learning they are usually thinking about learning with some little electronic device and most of these electronic devices provide you with menus. So, it's a more of a menu driven form of learning than what my generation came up with. Basically we weren't…we didn't have menus.

By first focusing on the student, this instructor recognized the differences between how today's students approach learning and then develop approaches that will help students be successful.

Focusing on the student is perhaps the first step to creating an environment where a student is willing to engage in the learning process. When the central focus of instruction is placed on a student, it sends a message to the student that they are important and are an integral component of the learning process. Instructors further indicated that in classroom it is important to create an environment where learning is a two way street. Focusing on the student was implemented directly in the classroom in often simple ways. One example was faculty members making an effort to know students' names. "I appreciate someone who knows my name and so I kind of go that other people do to." This same participant indicated that even in a class of more than 200 students it was still possible to learn 80 - 90% of their names. This simple act can have an extraordinary effect in terms of care for students and an emphasis on them and their learning as the focal point of effective teaching.

Effective teaching requires dialogue and is relevant.

By first focusing on students and making sure that their needs were understood, faculty were then able to create a dialogue between themselves and the students. This dialogue fostered

a situation where students feel that they are active participants in the learning process. When a student is actively engaged in the process of learning then faculty members are more than willing to meet them half way, or in some cases beyond that. As one participant explained:

> …there's that old adage…something like a student or a child…isn't a vessel to be filled but a light to be turned on or something like that. I don't want to cram stuff down into the mouth or the brain of an unwilling student, but, you know, if the student is there and wants to learn, then you know, I'll play, I will play as far as you want to go.

This was a common theme among all participants. Exemplary teachers stressed the notion that students have a responsibility in the learning process. As a teacher, you must recognize this and hold not only yourself accountable but also the student. To further make this point one participant stated:

> Part of college is taking responsibility for your own learning…Can I force someone to learn who doesn't want to learn? I don't think so. Can I force them to memorize a bunch of stuff and regurgitate it on a exam and then give them a grade? Yeah, but that is not really learning and this is not really teaching either.

By creating dialogue with students they become much more engaged in the learning process. The exemplary teacher did everything within their power to plan for, deliver, and reflect on effective teaching. They recognized that it was their responsibility to create an environment where students are more likely to engage in the learning process, but they acknowledge that ultimately the students must do their part as well.

When talking about their teaching, award winning faculty instructors stressed the need to make the content relevant to the students. Through their actions, they tried to address issues that were authentic and connected to real life or current topics. Often, faculty used a more problems-based approach to their teaching and incorporated opportunities for their students to actually do some project or task that would allow the students to experience the topic being taught. Additionally, it was noted that learning experiences often extended well beyond the walls of the traditional classroom. To help illustrate this theme one faculty member shared the following:

> We are putting together a mentoring program; you see this is how I think about teaching. We have an advisory board that assists us with this so my first thought was rather than have faculty or alumni do the mentoring program why not have students do it… they will form their own committee, they will put this together but when they go out looking for a job they will be talking about all the people they interacted with, how they did it, you know, so to me, boy, that is the kind of stuff that I think is as is important as what people do in the class.

In this case, the faculty member viewed the opportunity for the student to apply the skills they were discussing in class to a real life situation as vital to the students' learning experience.

Effective teaching is thinking and progression.

Participants all indicated how much they enjoyed their respective content areas and sharing their knowledge and love for their discipline with their students. However, all indicated that more important than simply teaching students' content, they strove to cause students to think about the content in a new way and critically analyze what they were being taught. More than simply sharing content, award winning instructors had the goal of creating critical thinkers and teaching students critical thinking skills that would be relevant to other aspects of their life. One faculty member explained this desire to help students become critical thinkers as follows:

> They may forget that William the Conqueror came into England in 1066 and took over and something like that, but I hope that they kind of begin to, they use the skills of, of the critical thinking, of learning not to take something at face value, but, that they dig a little deeper, that they sometimes, they need to do this throughout life.

By encouraging students to discover and utilize their critical thinking skills effective teachers focused on helping a student progress from where they currently are in their learning to some new point. This progression seemed to be their ultimate goal. In fact, effective teachers noted that they enjoyed watching students progress through the specific course they were teaching but were also motivated by watching the students grow and progress throughout their career at the University. Effective teachers took a lot of pride in watching their students be successful. According to one faculty member, "you know the students don't realize this but when our students succeed, we are ecstatic. I mean this is cool man!" One participant explained this notion of progression when asked to describe an effective teacher by stating:

> I think it's somebody who is able to take a young person sitting in a class and help them undergo this transformation from thinking of themselves as a student to thinking of themselves as a practitioner of that discipline for example there's a difference in thinking of yourself as a student in an animal science class as opposed to I'm an animal scientist. I really think that the really, really outstanding teachers are those who are able to get young people to put themselves in the position of being practitioners of that discipline.

The above quote helps to explain this notion of effective teaching. Effective teachers cause their students to think about issues in a different way than they had previously. By causing this shift in thinking, effective teachers create a situation where students progress from being simply students in a class to practitioners of a particular discipline.

The Act of Becoming and Evolving as an Effective Teacher

The second main theme that was identified dealt with the actual act of becoming and evolving as an effective teacher. Subthemes were identified that helped to explain how effective teachers viewed the process of effective teaching. First, participants discussed their views of teaching in terms of it being a form of Scholarship. Secondly, they viewed the entire teaching and learning process as a process of growth, not only for the teacher but also for the students.

Teaching as scholarship.

Exemplary teachers all agreed that teaching was a valid form of scholarship and that it was part of their professional responsibility to provide effective instruction. In describing the similarities between teaching and research one participant stated "it could be that they draw from the same skill set." They went on to explain the two activities by stating:

> I mean ultimately what is empirical research which is what I do. It's what do we know about a field what don't we know? How can I design a study to learn something that we don't know that would be interesting and then executing the plan and doing it? Ok, what's a lecture? You know, teaching, uhm, what do we know about this area, what's important to know for the student? How am I going to communicate it? So, you know, both of them are some level of just thinking.

The above view of scholarly teaching was consistent among participants. All indicated that they used this approach when planning for their teaching.

Additionally, participants agreed that their scholarship complimented their teaching. According to one faculty member "what I read to do my research is uhm, I can incorporate in my classroom in a variety of ways. So yeah, definitely, I think it is best when those [teaching and research] go together." In fact, participants indicated that often teaching was an outlet for them to share their scholarship, perhaps with more people than would view it when published in a journal. One participant explained:

> I think I am to the point where I get to decide where I am making the most impact. I have rationally thought about this and I love doing research and have four undergraduates in the lab doing research and I am never going to give that up, but I also think that spending ten thousand dollars on chemicals and however much time publishing something that only three people are going to read in the world is not making a big impact.

Through the lens of effective teachers, teaching was not viewed as more important than research but rather, both possessed the potential to incite a great deal of impact and both deserved to have time devoted to doing them well.

Teaching and learning as growth.

Exemplary teachers viewed the process of teaching and learning as a process of growth. Nearly all of the participants indicated that they did not view themselves as being experts but rather they were constantly striving to improve the quality of their teaching. Participants were asked if they felt that exemplary teachers were born or made. While all acknowledged that people are all born with certain talents and aptitudes, to be an effective teacher you must work very hard. All agreed that exemplary teachers are made. On participant used the following example:

> Albert Pujols is the best hitter on the planet. However, was he born a great hitter or did he make himself a great hitter. And, no matter what your natural talents are, how athletically capable you are, unless you work at hitting you're not going to be a great hitter. And I think the same is true of almost everything.

Exemplary teachers stressed the need for teachers to constantly work at improving their teaching skills. Several participants indicated that they felt that it was vital that they participate in professional development activities that related to teaching not only at their own universities but also at regional and national professional development programs. The Wakonse program, an annual teaching conference, was mentioned on several occasions with participants indicating that they felt that participating in the program and hearing about how others approach teaching helped to shape their own practice. Further, exemplary teachers indicated that they often implemented strategies that they adapted from other teachers.

Equally important according to participants was the need to reflect on the teaching and learning process. One participant told the following story about a junior faculty member concerned by how her classes were going. This story perfectly describes the importance of reflection but also ties in many of the all of the other themes that emerged from the data collected. The participant stated:

> A little bit of reflection is often very good, which is one of the things I tell other faculty. You will hear new faculty a lot of time go, God, class isn't going well, I am going to go get the book and I am going to read through this chapter again so I know exactly what…and I am immediately like, time out, stop, do not go do that. You already know way more than the students, the issue is not in the book. Your problem, if it's not going well, is your interaction with the students. You're not connecting with them, you're not engaging them; you need to do something different. Reading the book is not, ever, going to be the answer to your question.
>
> And, we had a young faculty member a few years ago go, I mean, almost verbatim that's what she said, and I said don't you dare do that and if I find out you did it, it's going to be hard getting me out of your office for awhile. And I said, how long would it take you to read that chapter, an hour? And she said, Yeah that probably I could do it in an hour. Alright, here is what I want you to do, you take a pad of paper, a pencil, you go somewhere for an hour and what you think about is what could I do to get these students to actually physically do something that would relate to the topic that you are trying to talk about. That hour will be substantially more valuable to you than anything you are going to get out of the book and I would stand by that.

This quote illustrated the essence of the manner in which exemplary teachers viewed teaching. First, they recognized that they already know more than their students and as a result really need to focus on them before they ever worry about the content. Second, it exemplified the need for finding ways to create a dialogue with the students and make the information being taught relevant. Finally, it helps to illustrate the importance of reflection and the need to always search for ways to grow as a teacher.

Conclusions/Implications/Recommendations

From the findings in this study, it was concluded that teaching and being an excellent teacher are complex issues. While the individual nuances of teaching may vary from individual

to individual and may work in one situation while not in another, there are some common themes that emerged when award-winning teachers were asked to describe effective teaching. This study was consistent with prior literature that identified common traits of effective teachers across different disciplines and different levels of teachers (Bransford, Darling-Hammond, & Lepage, 2005). Different in this study, however, was the fact that the essence of effective teaching in the experience of the participants in this study was not a focus on specific teaching skills or traits, but rather a description of particular habits of mind or ways of thinking about teaching. In broad terms these themes centered on the act of effective teaching and the process of becoming and evolving as an effective teacher.

The implication of this conclusion for teaching at the university level seems to suggest that while faculty may have little or no formal training or education in teaching, exemplary teachers talk about teaching and learning much like those who have studied the topic. While the terminology used may be different, the underlying themes are very similar. If this is the case, what can be done to better assist faculty who are struggling with their teaching so that they can become more effective in the classroom?

Perhaps one of the most important recommendations for future practice would be to help struggling faculty recognize the importance of focusing first on the students. When a faculty researcher begins a project one of the first things that is completed is a thorough review of the related literature. Every effort is made to learn about the topic of interest and to ensure it is understood before progressing. Perhaps a more scholarly approach to teaching should be emphasized. Before entering a classroom a faculty instructor should make every effort to learn about the students they will be teaching. What are their backgrounds? How have they been trained to learn? What expectations do they have from the class and the instructor and how do those expectations align with those of the faculty instructor? By first focusing on the students the faculty instructor is taking an important step toward ensuring an effective teaching and learning experience.

Additionally, it is recommended that more resources be provided for faculty interested in improving their teaching. It is very easy to suggest that faculty need to create dialogue with their students and ensure that students understand the relevance of the material being taught. However, this is easier said than done. Many universities have implemented faculty orientation programs to assist new faculty instructors in developing their teaching skills. The findings from this study suggest that these programs should focus on providing participants with training in teaching techniques and methods and should be made available to faculty regardless of their career stage.

Because teaching and learning effectively requires such an investment of time and effort perhaps promotion and tenure processes should be evaluated (Shapiro, 2006). If institutions truly value teaching then faculty, especially those in the beginning stages of their career must be rewarded for their teaching and not placed in a situation where they feel forced to choose between teaching and research. Participants in the study indicated both research and teaching draw from the same skill set. If this is the case and if both teaching and research are necessary and vital to the success of an institution, then faculty professional development programs and

performance review systems should help faculty realize the parallels between teaching and research and provide equal rewards for efforts in both areas.

To help better understand the themes identified through this study the researchers developed a Framework for Effective College Teaching (Figure 1). It was concluded from the results in this study that this framework served as a way that the exemplary teaching faculty conceptualized effective teaching. According to the way in which faculty members in this study thought about and thus talked about their teaching, at the core of effective teaching are two major themes dealing with the teaching and learning process. According to the participants in this study, the act of effective teaching depends on three main components: focusing on students, creating dialogue and making teaching relevant, and finally, recognizing that teaching and learning are a process of thinking and progression. Additionally, the act of becoming and evolving as an effective teacher emerged as a second major theme in the ways that the participants in this study conceptualized effective teaching. This theme is supported by the components of teaching as scholarship and teaching and learning as growth.

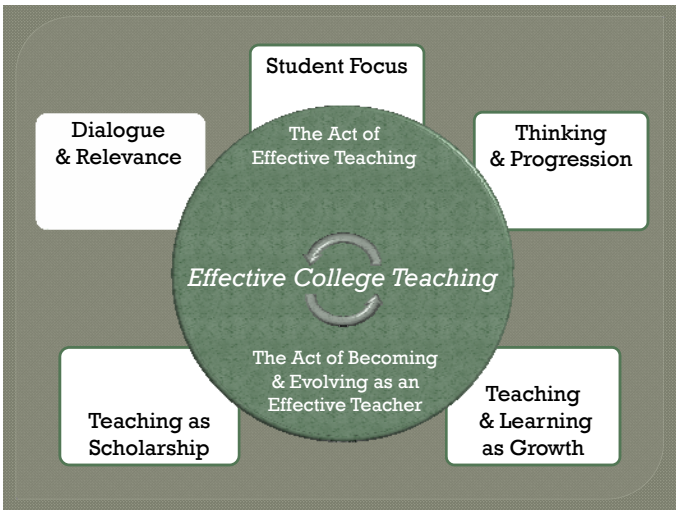

Figure 1. Framework for Effective College Teaching

It is important to note that this framework is merely a visual representation of how the participants in this study conceptualized teaching. It is recommended that this framework be used to develop a questionnaire for use with a quantitative research approach to explore and further validate the findings of this study. While this study provided some insight into how some faculty members think about teaching and learning, more in depth investigation is warranted. It is recommended that further quantitative and qualitative research be conducted on how university students view effective teaching and the connections or disconnect between faculty members' and students' views of effective teaching.

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Effective Teaching: An Investigation of Award Winning Faculty Instructors
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DISCUSSANT REMARKS

Barbara M. Kirby, North Carolina State University

Reading the reflections of award winning faculty is inspiring and leaves one with the optimistic hope that our classrooms will be filled with enhanced teaching and that students will truly experience learning. Given the expense of higher education, universities should be expected to deliver a high caliber education and students should respond by engaging in as many opportunities as possible to make them educated human beings prepared for the future. In reality, the delivery and the engagement fall on a continuum from "showing up" to "excellence." The authors are to be commended on a purposeful attempt to ascertain a teaching effectiveness perspective from those who have achieved "excellence" on the continuum.

The research focuses on dealing first with the act of effective teaching and second, the act of becoming and evolving as an effective teacher. The authors chose a purposive sample of 9 individuals from colleges across the campus. This is appropriate for a phenomenological study where these individuals focus on the meaning of their lived experience, the phenomenon of outstanding teaching. The demographics suggest that the group probably is a respected group of individuals elevated in their careers to associate or full professor based upon their contributions to teaching, research and/or extension, hold two or more awards above the department level and represent expertise in bench sciences, social sciences and liberal arts disciplines. Appropriate procedures were followed to select the participants. It is disappointing that only 9 were willing to spend one hour to one hour and a half sharing their teaching perspectives.

The award winning faculty possess common traits of outstanding teachers as described in the literature from the past, i.e. enthusiasm, connecting the content, learn by doing, etc. However, the sensitivity is about focusing on students first, content second. Know your students. Helping students develop thinking skills, not just lecturing but helping students process the relevant content through dialogue and progress from knowing to understanding. How do we create an environment where learning is a two way street; how do we know our students in lecture halls up to 400 students? What is the roll of technology? When we move from teaching objectives to learning outcomes, how do we know learning has occurred – outcomes met? How are students engaged in the assessment process so that a faculty member has evidence that the teaching was effective?

Incorporating ones scholarship does compliment teaching. Students who yearn for prime laboratory experiences are on the edge of their seats when a faculty member connects the lecture to their research findings. The scholarship of teaching requires faculty to reflect on their teaching as noted in this study. It is unfortunate when a legislature accuses faculty of wasting valuable tax dollars because they are sitting around "thinking." How can the profession assist exemplary teachers in disseminating their scholarly teaching work so the institution respects this

contribution? Beyond conducting further research, what professional development activities move the teaching culture to students first? How do we prepare the professoriate for the future?

The Relationship between Experience and Self-Perceptions of Knowledge and Relevance of Teaching Competencies for Faculty in a College of Agricultural and Life Sciences

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Abstract

There has been a call for academic institutions to improve the quality of their educational programs at both the graduate and undergraduate level. Previous research has found that the size and focus of the institution impacts the quality and resources given to instructional activities. However it has been noted that traditionally research-focused institutions now are beginning to appreciate the role and importance of their academic programs. This study sought to describe the differences existing among faculty's self-perceived knowledge and relevance of teaching competencies to deliver academic programs. Using a convenience sample of college of agriculture and life science faculty at a Research I university a web-based questionnaire was administered to collect data using three distinct set of questions regarding instructional and teaching needs. Faculty reported low self-perceptions in the area of distance delivery. Characteristics such as faculty appointment and rank were found to impact perceptions toward teaching as well. Recommendations for further research and programmatic development were also provided.

Introduction

Institutions of higher education are being challenged to improve academic quality (Dill, 1998, 2003; Eaton, 2006; Education Commission of the States, 1995). According to Dill (2003), academic quality is "equivalent to academic standards, that is the level of academic achievement attained by higher education graduates" (p. 1). A study conducted by Kuh (1999) articulated some of the reasons why academic quality has become a concern. Kuh found despite spending less time on learning activities, students in the 1990s were earning higher grades than their 1960s counterparts. Significantly less growth was reported for the later students in five areas of student learning outcomes, including personal development and an understanding of science and experimentation. Kuh argued faculty were partially to blame for the decline, stating:

> The faculty side is not requiring too much from students in terms of reading and written work in exchange for a decent grade—at least a B—provided that students don't make a fuss about the class or ask for too many meetings outside of class or too many comments from faculty on students' written work or exams (1999, p. 114).

A historically pro-research culture may be partly to blame for a lack of emphasis on teaching and its relationship to academic quality. Both Boyer (1990) and the Boyer Commission Report (1998) noted it has been common practice for faculty to be judged for promotion and tenure on their research productivity rather than their teaching abilities.

Boyer's (1990) call for a recognition for teaching as a scholarly activity seems to be gaining some ground. However, faculty are typically well prepared to perform the research aspects of their positions, but typically have little formal preparation for their teaching responsibilities (Roberts & Simpson, 2008; 2009). Recognizing the current situation, the Association of Public and Land-Grant Universities (APLU) recently called for the implementation of "faculty development, informed by research, on cognition in the teaching/learning process" (APLU, 2009, p. 8). The study reported in this article begins answering the APLU's charge by examining how the experience of faculty influence their knowledge of teaching.

This topic is of particular relevance to university faculty in agricultural education, as these faculty are often charged with providing professional development for their peers in other agricultural and life sciences disciplines. This is evidenced by the *National Research Agenda: Agricultural Education and Communication* (Osborne, 2007), which designated Agricultural Education in University and Postsecondary Settings as a priority area for research. More specifically, the research reported in this manuscript focuses on Research Priority Area 3: Enhance the effectiveness of agricultural and life sciences faculty. The results of this research will help agricultural education faculty provide relevant professional development, thus meeting the APLU's (2009) call for action.

Theoretical Framework

The fundamental theory that guided this study is experiential learning, which asserts that learning is a result of reflecting on experience (Dewey, 1938). More specifically, this study was framed by how experience influences knowledge and perceptions of teaching. Bransford, Brown, and Cocking (2000) proposed that teaching is learned through experiences such as (a) personal experiences, (b) interactions with peers, and (c) formal teacher preparation programs. This study specifically examines how various indicators of personal experience relate to faculty knowledge of teaching competencies. Understanding this phenomenon can allow for better targeted professional development activities within colleges of agricultural and life sciences, thus improving the quality of instruction and ultimately increasing student learning.

Dewey (1938) presented a concept he called continuity of experience to explain how personal experience influences learning. According to Dewey, each current experience is influenced by previous experiences. Thus previous experience, and the related cognitive schema (Bransford et al., 2000), serve as the foundation for current knowledge and action. Accordingly, current experiences will serve as the foundation for future experiences. Figure 1 presents a model that shows how experience influences teaching. The current study examines *previous personal experiences* (box 1) and *current teaching knowledge and experiences* (box 2). Future research can examine the connections between the other boxes.

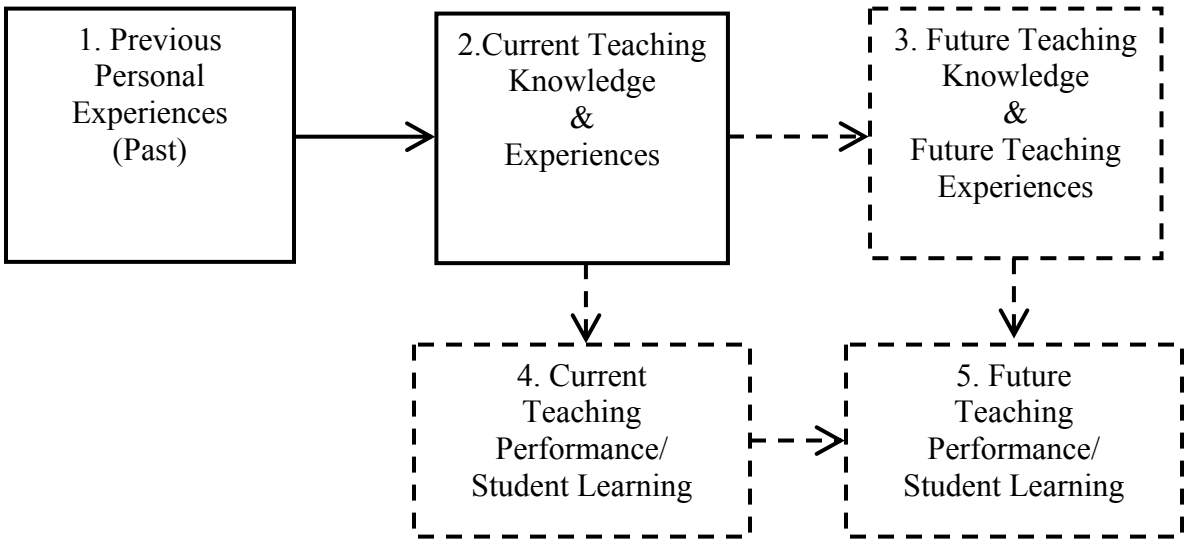

Figure 1. Conceptual model of how experience influences teaching.

Previous Personal Experiences

The single largest personal experience that provides the foundation for teaching is the years a faculty member spent as a *student*. However, Darling-Hammond and Bransford (2005) cautioned that the first-hand experiences of novice teachers acquired through their years as students provide many misconceptions about effective teaching. For a new faculty member, this could be as many as 25 years. Darling-Hammond and Bransford's position would support the notion that people tend to teach the way they were taught. This phenomenon has been called an apprentice of observation (Lortie, 1975). Darling-Hammond and Bransford asserted that observations alone may not capture the complex nature of effective teaching. In other words, students may not recognize all the factors that went into planning and delivering an effective teaching session. Further, basing the way one teaches off one's own experiences becomes even less relevant as the difference in age between the teacher and students increases. Fayne and Ortquist–Ahrens (2006) discovered that newly hired faculty found their own experiences as students to be very different than the experiences of the students they taught.

In contrast, personal experiences as a *teacher* can be very valuable. Teaching experience can come in formal settings, like college or K-12 classrooms, as well as informal settings like athletic coaching or other community activities. The teaching experiences of college faculty vary greatly (Roberts & Simpson, 2008; 2009). Several indicators provide some basis of determining teaching experience of college faculty. These include (a) the number of years of college teaching; (b) having "other" teaching experience; (c) faculty rank; and (d) percentage of formal academic appointment focused on teaching. In a study of newly hired faculty at Texas A&M

University, Roberts and Simpson (2009) examined previous teaching experience. The majority of the newly hired faculty were assistant professors (49 percent) or lecturers (17 percent). They found that 70 percent had graduate teaching experience. They also reported that 63 percent had previous college teaching experience, averaging 5 years. Roberts and Simpson also found that 53 percent had "other" teaching experience.

Another source of personal experience is that of independent reading and research. Faculty are typically well-prepared as researchers and it seems that they apply this skill set to learn more about teaching. Roberts and Simpson (2008; 2009) found that newly hired faculty frequently engage in independent research and reading. Although faculty may not follow all the way through to dissemination, it would appear that Boyer's (1990) notion of the Scholarship of Teaching is being embraced by faculty.

Another source of personal experience related to teaching is attending professional development activities. When examining the effects of these activities, Whittington (1998) discovered that faculty development can make a difference in the teaching practices. Over a nine month period, selected faculty participated in a series of workshops that taught them to teach at higher levels of cognition. After completing this series of workshops, faculty actually elevated the cognitive levels of their teaching.

College of agricultural and life science faculty have varying amounts of *previous personal experience* related to teaching. They all have previous personal experiences as *students*. They also have varying amounts of experience as *teachers*. The amount of teaching experience is difficult to quantify, however, faculty rank and years of college teaching can provide some level of quantification. Additionally, the official appointment split (teaching/research/extension) can also provide some insight. Finally, faculty can gain valuable experience through a variety of professional development activities.

Current Teaching Knowledge and Experiences

Researchers have also examined teaching knowledge of college of agriculture faculty. Wardlow and Johnson (1999) studied faculty in the College of Agriculture, Food and Life Sciences at the University of Arkansas. Their study showed that faculty had one-quarter of their time assigned to responsibilities associated with teaching or instruction. Wardlow and Johnson also established the current perceptions of faculty related to teaching competence and found that traditional teaching activities such as, "lecture, demonstration, preparing teaching materials, and motivating students" (p. 53) were self-rated as "good to excellent." Conversely, lower teaching competency scores were associated with activities such as, "alternative teaching activities, using cooperative learning and case studies, and faculty peer observation" (p. 53). Wardlow and Johnson concluded that teaching needs and self-perceived proficiency could not be used as an indicator of interest for professional development opportunities. They concluded there is a need for in-service training focused on felt needs, as well as educational technologies. They recommended that teaching enhancement programs focus specifically on "motivating students, encouraging critical thinking, using interactive technology in teaching, techniques to improve student reading and writing, alternat[ive] teaching methods, evaluating teaching, and evaluating student learning" (p. 55).

Wingenbach and Lander (2002) examined faculty from the College of Agriculture and Life Sciences and the College of Education at Mississippi State University. They found that faculty from both colleges had greater self-perceived competence in traditional teaching methods than in emerging methods and technologies. Their study also revealed that faculty who had formal pedagogical preparation had a greater desire to learn about emerging educational technologies. Faculty were most interested in learning about encouraging critical thinking; motivating students; using hands-on and problem-solving activities; and learning about alternative teaching methods. They were least interested in learning about preparing a course syllabus; developing a teaching portfolio; revising a course; and preparing effective lesson plans.

One of the more systematic examinations of current teaching knowledge and experiences of faculty in agricultural and life science classrooms has been led by Susie Whittington (Ewing & Whittington, 2007; Lopez & Whittington, 2000, 2001; Whittington, 1998; Whittington, Stup, Bish, & Allen, 1997). This work has focused on the cognitive level at which faculty teach. This body of work generally shows that faculty ascribe to teach at higher levels of cognition, but generally teach at lower levels of cognition.

Current teaching experiences can be influenced by the larger mission of the university. One such example has to do with undergraduate academic advising. Because of the heightened importance placed on research for tenure track faculty (Rhoades, 2001) other academic staff have been hired to advise and provide academic administrative services, which were once the primary responsibility of faculty. This decreases some of the contact that faculty have with undergraduate students, thus reducing opportunities for faculty to learn more about students and lessens opportunities for informal teaching.

Current teaching knowledge and experiences for faculty in colleges of agricultural and life sciences vary greatly. Faculty tend to have greater knowledge and comfort with more traditional pedagogies, like lecture, but have an interest in learning more about innovative and alternative ways to teach. Faculty may not be able to accurately assess their own current teaching practices.

Previous research gives us a partial picture of previous personal experiences of college of agricultural and life science faculty. Previous research also gives us a partial picture of current teaching knowledge and experiences of faculty. The current study seeks to add to this body of knowledge by examining the relationships between previous personal experiences and current knowledge and experiences. This knowledge lead to tailored professional development activities for faculty with varying amounts of teaching experience. Ultimately, as portrayed in Figure 1, this could lead to increased student learning.

Purpose and Objectives

The purpose of this study was to describe the differences existing among faculty's self-perceived knowledge and relevance of teaching competencies. Using demographic factors such as, rank, title, years teaching experience in higher education, other teaching experience, and

formal percentage of appointments in teaching, research and extension researchers were able to systematically examine data.

The objectives guiding the study included to describe:
1. Faculty self-perceived knowledge and relevance of teaching competencies,
2. Differences which exist among faculty self-perceived knowledge and relevance of teaching competencies as analyzed by demographic variables, and
3. Relationships which exist between faculty self-perceived knowledge and relevance by formal appointments in teaching, research and extension.

Methods

This quantitative study was descriptive in nature with the intent of providing a detailed analysis of the factors impacting faculty's perceived knowledge and perceived relevance of teaching and instructional strategies in higher education. This study was a component of a larger study examining faculty's perceptions of teaching and instructional strategies. The researchers used a convenience sample of college of agriculture and life science faculty at a Research I university. There are 17 academic departments represented by 522 faculty with a formal teaching appointment. Departments include both social science and bench science disciplines.

A web-based questionnaire was administered using SurveyMonkey. Specific data was collected using three distinct set of questions regarding instructional and teaching needs: (a) teaching competencies, (b) preferences toward professional development in the area of teaching, and (c) demographic information. To meet the objectives of this study, data collected in question set (a) and (c) were used in the analysis.

There were 23 Likert-type questions included the teaching competencies portion (section a) of the questionnaire. Questions were developed from compilation of assessments previously administered through the college's teaching resource center at this Research I university. Using the constant-comparative method (Glaser & Strauss, 1967) researchers systematically analyzed questions to determine those which would be most demonstrative of teaching competence. The five point Likert scale ranged from 1, Low Knowledge/Low Relevance, to 5, High Knowledge/High Relevance. Faculty then self-reported their perceived knowledge of the 23 teaching competence statements, as well as the perceived relevance of those competencies to their position. The intent of this study was to establish the variance existing among the different faculty groups as they relate to self-perceived knowledge and perceived relevance of teaching competencies.

Validity of the instrument was established through an expert panel review of educators whom were not directly affiliated with the study. Recommendations indicated a revision and after modification both content and face validity were deemed appropriate for the intent of the study. Using a test-retest procedure, researchers were able to document a reliability coefficient of .84.

Demographic data collected categorized faculty respondents by official institutional reported rank/"rank," (Lecturer=1, Senior Lecturer=2, Assistant Professor=3, Associate

Professor=4, or Professor=5), years of college teaching experience (at current institution or other college/university)/"yrs teaching," (0=0, 1=1-3, 2=4-6, 3=7-10, 4=11-15, 5=16-20 or 6=over 20 years), and other teaching experience/"other teaching," (No=0 or Yes=1).

Using the Tailored Design Method (Dillman et al., 2009), researchers notified participants by email in January 2009 of the study. Two days later an email notice was sent with the link to the SurveyMonkey questionnaire. Two notices were sent to non-respondents via email at one week intervals. Those with invalid emails (n=7) and self-exclusion (n=26) were removed from the study, resulting in a possible 489 participants. An additional 19 opted out and the final response rate for the study as 46.8% (n=220). There were another 32 responses which were discarded due to incomplete information reducing the total number of useable responses to 188. Researchers determined that the convenience sample of respondents would be appropriate for inferential statistics as required by the research objectives.

Researchers used methodology established by Miller and Smith (1983) to address concerns regarding non-response error. Using a chi-square test, researchers identified a significant difference among faculty's "rank" (α=.05, set a priori). Based on this finding, the researchers guard against any generalizations beyond the respondents of the study.

There were three different statistical analyses conducted to report findings for each of the three research objectives. Objective one used descriptive statistics including, means and standard deviations to report respondents' self-perceived knowledge and relevance of teaching competencies to their position. The researchers used a multivariate statistical analysis, including F-tests, significance (p at α=.05, set a priori), and partial eta squared to show effect size to analyze objective two. Results were interpreted by defining small, medium, and large effect sizes at the .10, .25, and .40 levels, respectively (Cohen, 1992). Lastly, Pearson Product Moment Correlation coefficients were used to report direction and magnitude of relationships between self-perceived knowledge and relevance teaching competences and formal percentages of teaching, research and extension appointments with significance reported by p (α=.05, set a priori). Magnitude of Pearson Product Moment Correlation coefficients (r) were categorized by: r= 1.0 (perfect); r= 0.99-0.7 (very high); r=0.69- 0.50 (substantial); r= 0.49- 0.30 (moderate); r= 0.29- 0.10 (low); and r= 0.09-0.01 (negligible) (Miller, 1998).

Findings

The following findings are outlined for each specific objective. As acknowledged by the researchers there were significant differences identified between respondents and the population as they relate to "rank," so it is recommended that generalizations be maintained to this study.

Objective 1. Describe faculty self-perceived knowledge and relevance of teaching competencies.

The researchers used descriptive statistics to analyze faculty self-perceived knowledge and relevance of teaching competence. There were a total of 46 different statements measuring teaching competence, 23 for self-perceived knowledge and 23 addressing relevance of the competence to the respondent's position. Scores for self-perceived teaching competence ranged from M=2.30, SD=1.29 for knowledge of distance education basics to M=3.63, SD=.97 for

knowledge of effective lecturing. Scores on the relevance side of the scale ranged from *M*=2.55, *SD*=1.58 for relevance of teaching large classes to *M*=4.17, *SD*=1.36 for relevance of effective lecturing. As the scores show, self-perceived knowledge of effective lecturing, as well as relevance of this competence were scored high by respondents.

There were 13 additional competencies were respondents reported a self-perceived score of three or more, of the 13 only two were scored above *M*=3.50, knowledge of clarity in teaching *M*=3.54, *SD*=1.04 and knowledge of graduate advising *M*=3.51, *SD*=1.31. Likewise there were eight scored *M*=2.99 or below; however, only one scored at or below the *M*=2.50 (mentioned above). On the relevance scale, there three other competencies which respondents scored over *M*=4.00 or higher, relevance of teaching critical thinking *M*=4.05, *SD*=1.22, relevance of clarity in teaching *M*=4.02, *SD*=1.24, and relevance of graduate advising *M*=4.02, *SD*=1.23. Respondents did score four competences below *M*=2.99. These were relevance of teaching multicultural classrooms *M*=2.99, *SD*=1.45, relevance of distance education basics *M*=2.78, *SD*=1.63, relevance of teaching in lab settings *M*=2.75, *SD*=1.67, and relevance of undergraduate advising *M*=2.58, *SD*=1.61.

These scores provide a context for moving forward into objective two, specifically in respect to the large standard deviation scores for relevance. It is important to identify differences existing among respondents as they relate to demographic variables.

Objective 2. Describe differences which exist among faculty self-perceived knowledge and relevance of teaching competencies as analyzed by demographic variables.

Objective 2 findings are reported using a multivariate analysis where competencies were group by self-perceived knowledge or relevance and then analyzed by demographic variable. The researchers arranged these groups in recognition that teaching knowledge in one area may impact teaching knowledge in another (effective lecturing/effective teaching fundamentals) and likewise with reported relevance.

Rank

Mean scores for each of the rank categories were reported for both perceived knowledge and relevance. High and low scores are reported for each rank category. For the construct of self-perceived knowledge respondents in rank 1 (lecturer, *n*=5) scored teaching in lab settings lowest (*M*=1.80, *SD*=.83) and clarity in teaching highest (*M*=4.20, *SD*=.48). Senior lecturers (rank 2, *n*=2) scored distance education basics (*M*=1.00, *SD*=.00) lowest, as did all other rank categories: assistant professors (rank 3, *n*=55) (*M*=2.27, *SD*=1.30), associate professors (rank 4, *n*=44) (*M*=2.59, *SD*=1.35), and full professors (rank 5, *n*=55) (*M*=2.29, *SD*=1.24). High scoring teaching competencies for senior lecturers included clarity in teaching (*M*=4.00, *SD*=.00), cooperative learning (*M*=4.00, *SD*=.00), using experiential learning (*M*=4.00, *SD*=.00), and using web-based technologies (*M*=4.00, *SD*=.00). The high score reported by assistant professors was effective lecturing (*M*=3.36, *SD*=1.01) and was also the high score for associate professors (*M*=3.82, *SD*=.79). Full professors scored knowledge highest in graduate advising (*M*=3.89, *SD*=.98).

Relevance of teaching competencies for lecturers ranged from low, graduate advising (*M*=2.60, *SD*=2.19) to high with three different competencies: clarity in teaching (*M*=4.80, *SD*=.447) and effective lecturing (*M*=4.80, *SD*=.447). Senior lecturers (*n*=2) scores ranged from low, distance education basics (*M*=1.50, *SD*=.71) and graduate advising (*M*=1.50, *SD*=.71) to high with effective teaching fundamentals, clarity in teaching, effective lecturing, learning styles of students, questioning techniques, cooperative learning, active learning strategies, getting students engaged in learning, using experiential learning, better teaching through better testing, creating the perfect course syllabus, and undergraduate advising all scoring *M*=5.00, *SD*=.00. For assistant professors, scores ranged from low, undergraduate advising (*M*=2.51, *SD*=1.38) to high with graduate advising (*M*=4.43, *SD*=.89). Relevance of teaching large classes was scored low by associate professors (*M*=2.95, *SD*=1.66) and relevance of effective lecturing scored high (*M*=4.33, *SD*=.97). Lastly, full professors scored relevance of teaching large classes low (*M*=2.06, *SD*=1.36) and graduate advising high (*M*=4.06, *SD*=1.86).

The multivariate analysis for rank and self-perceived knowledge was significant (*F*=1.86 (4, 183), $p<.05$). The partial Eta squared was .24, indicating a medium effect, showing that rank accounted for 2.4% of the variance in self-perceived knowledge. Analysis for rank and perceived relevance was significant (*F*=1.31 (4, 177), $p<.05$). Partial Eta squared was .19, indicating a small effect, showing that rank accounted for 1.9% of the variance in relevance.

Years of College Teaching Experience

There were six distinct categories for years of college teaching experience. The first group (category 0) indicated respondents had less than one year of experience (*n*=10). Self-perceived knowledge of teaching competence for this group ranged from low using web-based technologies for managing courses (*M*=2.50, *SD*=1.80) to high in clarity in teaching (*M*=3.90, *SD*=.99). The second group's (category 1) experience ranged from 1-3 years (*n*=28). This group scored self-perceived knowledge of distance education basics low (*M*=2.39, *SD*=1.27) and effective lecturing high (*M*=3.79, *SD*=.63). Four other groups also scored effective lecturing high, group 2 (4-6 years experience, *n*=15, *M*=3.73, *SD*=.80), group 3 (7-10 years experience, *n*=24, *M*=3.67, *SD*=1.27) group 5 (16-20 years experience, *n*=12, *M*=3.33, *SD*=1.07) and group 6 (over 20 years experience, *n*=25, *M*=3.48, *SD*=1.01). Group 3 also scored graduate advising high (*M*=3.79, *SD*=1.18), as did group 5 (*M*=3.33, *SD*=1.16). Clarity in teaching scored high for group 4 (11-15 years, *M*=3.60, *SD*=1.10). Knowledge of distance education basics was the low score for groups 3 (*M*=2.17, *SD*=1.34), 4 (*M*=1.95, *SD*=1.05), 5 (*M*=2.17, *SD*=1.34), and 6 (*M*=2.32, *SD*=1.32) (roughly 7 to over 20 years teaching experience).

Perception of relevance of teaching competencies for novice instructors (less than 1 year) ranged from low, teaching in lab settings (*M*=2.27, *SD*=1.56) and undergraduate advising (*M*=2.27, *SD*=1.56) to high effective teaching fundamentals (*M*=4.00, *SD*=1.55). Those with 1-3 years experience (group 1) scored relevance of teaching large classes low (*M*=2.22, *SD*=1.45). Other groups scoring undergraduate advising low were group 2 (4-6 years, *M*=2.86, *SD*=1.79), group 4 (11-15 years, *M*=2.39, *SD*=1.29), and group 5 (16-20 years, *M*=2.00, *SD*=1.33). Group 1 (1-3 years) scored graduate advising high (*M*=4.44, *SD*=.93), as did group 6 (over 20 years, *M*=4.20, *SD*=1.00). Other high scores for relevance included clarity in teaching (group 2, 4-6 years, *M*=4.50, *SD*=.76), effective lecturing (group 3, 7-10 years, *M*=4.42, *SD*=1.02 and group 5,

16-20 years, *M*=4.00, *SD*=1.05), teaching critical thinking (group 4, 11-15 years, *M*=4.22, *SD*=1.00) and active learning strategies (group 2, 4-6 years, *M*=4.50, *SD*=.65).

Multivariate analysis showed there were no significant difference between years teaching experience and self-perceived knowledge of teaching competencies (*F*=.831 (6, 151), *p*>.05). Partial Eta squared was .15 indicating a small effect. Analysis to determine significant differences across relevance scores by years of collegiate teaching experience showed no significant differences (*F*=.875 (6, 150) *p*>.05). Partial Eta squared was calculated at .16 indicating a small effect.

Other Teaching Experience

Other teaching experience was reported as a dichotomous variable, No (0, *n*=39) or Yes (1, *n*=75). Low scores of self-perceived knowledge for both groups, those with other teaching experience and those without was in distance education basics (*M*=2.15, *SD*=1.29 and *M*=2.27, *SD*=1.27, respectively). However, when looking at high scores for these groups, those with no other teaching experience scored self-perceived knowledge of graduate advising highest (*M*=3.69, *SD*=.97), while those with other teaching experience scored effective lecturing highest (*M*=3.65, *SD*=.98). For relevance of teaching competencies those with no other teaching experience scored teaching large classes lowest (*M*=2.08, *SD*=1.55), while those with teaching experience scored distance education basics lowest (*M*=2.58, *SD*=1.67). Both groups scored graduate advising as most relevant, no other teaching experience (*M*=4.30, *SD*=.91) and with other teaching experience (*M*=4.19, *SD*=1.12).

Multivariate analysis for both showed no significant differences between these groups. Self-perceived knowledge by other teaching experience resulted in *F*=1.42 (1, 135), *p*>.05 and partial Eta squared calculated at .27 indicating a medium effect. Relevance by other teaching experience resulted in *F*=1.27 (1, 134), *p*>.05 and partial Eta squared calculated at .26 indicating a medium effect.

Objective 3. Identify relationships which exist between faculty self-perceived knowledge and relevance by formal appointments in teaching, research and extension.

Findings associated with this objective showed many variations in relationships between faculty's self-perceived knowledge and relevance of teaching competencies and formal appointments in teaching, research and extension.

There were a total of 45 individual statements which were significant with 23 being related to self-perceived knowledge and 22 being related to relevance. Pearson Product Moment correlation coefficients for self-perceived knowledge ranged from low (*r*=0.10-0.29) to moderate (*r*=0.30-0.49), while relevance coefficients ranged from low to substantial (*r*=0.50-0.69). Because of the number of statements with significant differences findings are presented in tabular format.

Table 1
Pearson Product Moment Correlation Coefficients for Self-Perceived Knowledge by Teaching, Research and Extension Appointment (n=185)

	Knowledge			Relevance		
Statement	T	R	E	T	R	E
Effective teaching fundamentals	.355*	-.151*	-.173*	.542*	-.308*	-.227*
Teaching large classes	.390*	-.254*	.099	.422*	-.352*	-.051
Teaching in lab settings	.193*	.023	-.249*	.308*	-.090	-.241*
Teaching in multicultural classrooms	.372*	-.217*	-.162*	.458*	-.198*	-.263*
Clarity in teaching	.441*	-.243*	-.172*	.509*	-.178*	-.335*
Effective lecturing	.346*	-.195*	-.110	.473*	-.163*	-.294*
Learning styles of students and faculty	.373*	-.185*	-.157*	.512*	-.301*	-.204*
Questioning techniques	.377*	-.152*	-.201*	.505*	-.200*	-.313*
Teaching critical thinking	.300*	-.015	-.261*	.447*	-.104	-.378*
Cooperative learning	.369*	-.202*	-.152*	.475*	-.207*	-.247*
Peer evaluation	.369*	-.108	-.214*	.400*	-.212*	-.186*
Active learning strategies	.393*	-.174*	-.188*	.531*	-.247*	-.273*
Getting students engaged in learning	.345*	-.155*	-.176*	.492*	-.195*	-.334*
Using experiential learning	.353*	-.350*	.020	.479*	-.322*	-.140
Using technology in teaching	.241*	-.069	-.153*	.402*	-.131	-.295*
Using web-based technologies for managing courses	.341*	-.131	-.244*	.400*	-.189*	-.225*
Distance education basics	.242*	-.062	-.192*	.185*	-.125	-.035
Better teaching through better testing	.466*	-.159*	-.299*	.488*	-.161*	-.342*
Using student evaluations to improve teaching	.375*	-.079	-.278*	.495*	-.225*	-.291*
Creating the perfect course syllabus	.486*	-.187*	-.291*	.549*	-.247*	-.311*

Undergraduate advising	.493*	-.278*	-.198*	.600*	-.389*	-.216*
Graduate advising	.010	.217*	-.223*	-.024	.135	-.115
Academic Dishonesty	.205*	.014	-.216*	.334*	-.117	-.235*

**note scores are significant at p<.05.*

Conclusions

Conclusions are presented for each objective reported in the findings section.

Objective 1.

Objective one provided findings as they relate to faculty's self-perceived knowledge and relevance of teaching competencies. With that, low scores showed that faculty do not consider themselves to be knowledgeable in the area of distance education basics. This may be problematic due to the increasing use of distance delivered courses at higher education institutions (Born & Miller, 1999). However, the relevance score for this concept was not scored high either, indicating that faculty are not concerned about distance education basics, both knowledge and relevance scores were low. This may be a growing issue as requirements for course delivery grow and expand to be more far reaching, especially beyond the traditional classroom. Faculty's level of resistance to distance education has been a constant concern and this finding reiterates this idea (Murphrey & Dooley, 2000; Wigenbach & Ladner, 2002).

Traditional teaching methods, like effective lecturing, are still considered important as it was scored high for self-perceived knowledge and relevance. This finding supports the idea that faculty are more comfortable using traditional methods versus those which are more contemporary or challenging, like distance education.

An interesting finding showed that while graduate advising was scored high for both self-perceived knowledge and relevance, undergraduate advising was not, it was scored low in relevance. This supports Rhoades (2001) who purported a shift in responsibilities, away from tenure track faculty to other academic support personnel, specifically for activities like undergraduate advising.

Objective 2.

Objective two was reported by segmenting respondents into different demographic categories: rank, years of college teaching, and other teaching experience. In reviewing the findings of objective two there is one clear and consistent message across all demographic variables, faculty's self-perceived knowledge and relevance of distance education basics is low. However, senior lecturers reported a moderate level of knowledge for using web-based technologies for managing courses (WebCT, E-Learning, etc.).

As Wardlow and Johnson (1999) found faculty's perception of knowledge as it relates to traditional teaching methods were also scored high with senior lecturers (those who have a high level of teaching responsibility) like, teaching fundamentals, effective lecturing, cooperative learning, active learning strategies, and undergraduate advising. As one would expect, they scored graduate advising as low relevance. For full professors, responsibilities do shift as is seen with scores showing low relevance of teaching large classes, but high for graduate advising. All groups recognized the importance of effective lecturing as being relevant to their positions.

Overall, there were significant differences in these groups' self-perceptions of knowledge of teaching competencies, as well as relevance. This does indicate that as we progress through the ranks of teaching, including those non-tenured (lecturer and senior lecturer) that needs change and perceptions of importance are based on teaching and other administrative responsibilities, which coincide with changes in rank.

The researchers designed categories to align with milestones to address differences based on experience. Again, groups scored distance education basics low, with four of six groups scoring it the lowest in self-perceived knowledge. Those earlier in their careers found that they perceived themselves prepared for the teaching basics, effective teaching fundamentals, clarity in teaching and effective lecturing. Moreover, advising differences indicated that teaching faculty are either not required to advise undergraduate students (as it was scored low) or have other academic support personnel fulfilling that role, but do advise graduate students. Other important areas to point out are high scores for teaching critical thinking and active learning strategies; while they were not scored low in self-perceived knowledge does indicate that teachers, regardless of their number of years experience see the importance of these skills to the teaching and learning process. There were no significant differences among the scores.

Other teaching experience did not play a significant role in differences and thus consistencies in scores among the two groups showed graduate advising is relevant and that again, distance education basics are scored low in terms of self-perceived knowledge.

Objective 3.

The intent of objective three was to show relationships which exist between percentage of teaching appointment and self-perceived knowledge and relevance of teaching competencies. Of the 23 individual knowledge statements significant correlations were reported 57 times across teaching, research and extension appointments, like wise there 58 significant correlations relating the relevance. The greatest conclusion drawn by this objective is that percentage of appointment across teaching, research and extension influences self-perceptions of teaching knowledge and relevance. While each competency was classified as a teaching competency that does not negate the relevance of to those with research or extension appointments as is shown by the significant negative correlations among these two groups, as is contrasted with significant positive correlations with teaching appointment. As one may contend, even faculty with research appointments may still advise graduate students, host students (undergraduate and graduate) in their laboratories (teaching multicultural, questioning techniques, and teaching in lab settings) and each of these were significantly and negatively correlated with research appointment.

Recommendations

Recommendations for this study focus on development efforts available for faculty.

Additional Research

- Continue to explore the teaching competencies of faculty through student evaluations and peer evaluations (360^{o} approach).
- Further identify why faculty have the perceptions regarding relevance of teaching competencies.
- Continue to investigate the role of distance education at higher education institutions to establish or justify the low relevance scores.
- Further investigate the negative correlations between research and extension appointments as they relate to teaching competencies.
- Identify results of faculty development programs in the areas outlined in this study.
- Explore the role of academic support personnel to determine what responsibilities align with different roles.

Programmatic

- Develop peer mentoring programs which capitalize on demographic differences, especially the expertise of senior lecturers.
- Invite and/or extend courtesy invitations to research and extension faculty to attend workshops related to teaching.
    - Host specific workshops with their perceived needs in mind.
- Institute clearer guidelines or expectations as they relate to the importance or role of distance education.
- Provide panel discussion or brown bag opportunities to faculty based on rank, for educational and networking purposes.
- Include those with advising responsibilities to share in workshops to further enhance their advising, especially as it relates to graduate advising.

This study provided a means for establishing differences which exist among faculty based on demographic. While few significant differences exist between groups at the demographic level, only reported rank, other findings and conclusions support the continued need for professional development and networking opportunities for faculty.

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The Relationship between Experience and Self-Perceptions of Knowledge and Relevance of Teaching Competencies for Faculty in a College of Agricultural and Life Sciences

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DISCUSSANT REMARKS

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Research I Universities continue to make difficult decisions in the face of devastating budget cuts. The reduction of resources impacts the size of classrooms, numbers of assistantships, technician positions, operating resources, student services and professional development activities. We are asking faculty to do more with less. We are negatively impacting students in the classrooms and laboratories. We are minimizing or eliminating programs that enhance learning, professional development and student services. This study is timely given the APLU's call (without funds) for the implementation of "faculty development, informed by research, on cognition in the teaching/learning process." It is important to know the capabilities of our teaching faculty and to target the faculty development to meet their professional needs.

Experiential learning served as a theoretical foundation. This study described the differences existing among the faculty's self-perceived knowledge and relevance of teaching competencies to deliver academic programs. The quantitative study was descriptive in nature and followed appropriate procedures for survey research. The authors used a convenience sample of the 522 faculty with formal teaching appointments in the college. The use of technology to generate the survey, contact subjects and conduct follow-up is cost efficient and generally effective. Even with two follow-ups, one cannot make people read their email or keep them from hitting the delete key. The researchers addressed the non-response error and cautioned the readers not to generalize results beyond the study population with regard to faculty rank. The results of the study would achieve more clarity if the authors would create a summary table of the most knowledgeable and relevant competencies by rank. A quick scan could answer the following questions: Who knows what about teaching? What is important? What is needed?

The results make sense within the context of rank and appointment. Lecturing is pretty basic and according to Level 1 lecturers to full professors, they are all competent, effective lecturers; lecturing as a traditional teaching method is relevant. Given a menu of teaching competencies such as clarity of teaching, cooperative learning, experiential learning, critical thinking skills, knowledge of learning styles and using web-based technologies, the mean score for knowledge and relevance seems to decrease as the rank increases. Lecturers are knowledgeable of the teaching competencies required for large classrooms and see the relevance. Upper ranked faculty saw less relevance in teaching large classes. Is this why the lecturers teach the large introductory classes in Biology, Chemistry and Physics? Ranked faculty advise graduate students, not lecturers. Full professors fail to see the relevance of advising undergraduates or teaching them in laboratories. Who is in charge of the undergraduates? Who gives attention to multicultural teaching? Why is Distance Education not embraced? What

expectations do we have of faculty by rank and appointment? Given these findings, describe the next faculty development plan?

Evaluating Cognitive Relationships: Identifying How Critical Thinking, Problem Solving, and Learning Styles Relate in Agricultural Education

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Abstract

The influences of cognitive styles have been the focus of research on problems in education for quite some time (Witkin, Moore, Goodenough, & Cox, 1977). In fact, agricultural educators are rapidly increasing the amount of research and education focused on understanding and utilizing cognitive function in an attempt to improve educational programs. The purpose of this study was to describe the relationships between three measures of cognitive function: critical thinking disposition, problem solving style, and learning style when participants are encouraged to engage in their natural cognitive tendencies by being placed in an intense environment. These three cognitive styles/dispositions were measured and analyzed for correlations. Substantial relationships were discovered. Cognitive abilities and preferences are repeatedly taken in to account when creating and revising educational programs to enhance student learning. With a greater understanding of how cognitive dispositions relate to one another, a clearer vision of student preferences and abilities can be taken in to account when creating educational curricula and activities.

Introduction

Research on problems in education have been focusing on the influences of cognitive styles in formal and non-formal education settings for quite some time (Witkin, et al., 1977). Keefe (1979) defined cognitive styles as a learner's preferred way of organizing and retaining information. Critical thinking ability has been recurrently identified as a cognitive style necessary for students in the 21st century and crucial for individuals to be able to deal with decisions faced every day (Myers & Dyer, 2006; Torres & Cano, 1995). Along with critical thinking, problem solving style and learning style are the primary cognitive styles being examined within agricultural education. In fact, agricultural educators are rapidly increasing the amount of research and education focused on understanding and utilizing cognitive function in an attempt to improve their programs.

Critical thinking ability is essential to student success; however, ability constantly changes as students learn and grow and is therefore extremely difficult to measure. By using critical thinking dispositions, which Irani et al. (2007) have identified as "the gateway through which one allows the mind to engage in critical thinking activity," (p. 2) a deeper, slowly changing preference rather than ability becomes the unit of measurement. These dispositions are measurements agricultural educators can use when assessing students and creating educational curriculum.

Critical thinking disposition, problem solving style, and learning styles have all been examined individually by agricultural educators with the results focused on how they can be used to enhance student learning (Boone, 1990; Cano, 1993, 1999; Cano & Martinez, 1991; Dyer & Osborne, 1996a, 1996b; Garton, Spain, Lamberson, & Spiers, 1999; Parr & Edwards, 2004; Rudd, Baker, & Hoover, 1998; Torres & Cano, 1994). In addition, cognitive relationships between critical thinking disposition and problem solving style, and critical thinking disposition and learning style, have been studied (Friedel, Irani, Rhoades, Fuhrman, & Gallo, 2008; Myers & Dyer, 2006; Rudd, Baker, & Hoover, 2000; Torres & Cano, 1995). However, all three have not been examined within the same context to gain an understanding of how they relate to one another.

Theoretical Framework

The conceptual framework for this study was created using theories that provide the foundation for the three cognitive styles being examined.

Critical Thinking Disposition

Critical thinking is a concept that has been challenging to define as exhibited by the many definitions available. Sumner (1940) defined critical thinking as "the intellectual processes by which the sense, sequence, interdependence, and rational consequences of facts are ascertained" (p. 32). A more current definition as stated by Rudd et al. (2000) is "a reasoned, purposive, and introspective approach to solving problems or addressing questions with incomplete evidence and information, and for which an incontrovertible solution is unlikely" (p. 5). Critical thinking has been recognized as one of the most important cognitive traits leading to an individual's success for quite some time (Sumner; Irani, et al., 2007).

Facione (1990) was the first to attempt to describe dispositions as they pertain to critical thinking while conducting a Delphi study using top researchers in the field. Seven separate dispositions were identified (Facione). While conducting a factor analysis of the California critical thinking disposition inventory, Moore, Rudd, and Penfield (2002) found the dispositions identified by Facione in 1990 were not represented. In an attempt to more accurately measure critical thinking disposition, Irani et al. (2007) used the Delphi study results and a review of literature in the field of critical thinking to create a new instrument, the UF-EMI.

The UF-EMI (2007) uses three constructs rather than seven: engagement, cognitive maturity, and innovativeness. A high engagement score signifies an ability to anticipate situations, look for opportunities to use reasoning skills, and confidence in reasoning, decision making and problem solving abilities (Irani et al.). A high cognitive maturity score signifies a knowledge of predisposition prior to making decisions, recognition of the environment's effect on opinions and an openness to the ideas of others. A high innovativeness score signifies a tendency to look for new knowledge, engage in new challenges, seek more knowledge, and an ability to question present beliefs, adjusting them based on new knowledge or experience.

Problem Solving Style

Kirton (2003) defined problem solving as an ability to "solve critical, complex problems in challenging environments" (p. 1). Since the world is ever-changing, problem solving becomes an essential part of human survival and is innate within each individual (Kirton). However, individuals approach problem solving differently. Adaption-Innovation theory (Kirton) asserted as an individual's style can be identified on a continuum between levels of adaption and innovation. An adaptive individual narrowly focuses their attention to solving a problem within defined boundaries. An innovative individual approaches problems from a larger perspective, stepping outside of boundaries or defying rules to come up with multiple solutions to the same problem. In order to analyze adaptive versus innovative style, the KAI was created using three constructs: sufficiency of originality (a preference for forming solutions), efficiency (a preference to use strategy), and rule/group conformity (a preference for structure).

Learning Style

The experiential learning theory of development defines learning style as an individual's preferred method of gaining knowledge. In Kolb's (1984) learning style model, learners are divided in to four categories: accommodating, assimilating, converging, and diverging. These four styles were created by evaluating the level at which the learner naturally tends to use reflective observation (reflecting), abstract conceptualization (thinking), active experimentation (doing), and concrete experience (experiencing) while learning (Kolb, 2007). A higher score in each of these areas signifies a preference for that style of learning.

Kolb (2007) identified typical characteristics associated with each of the four groups. Those preferring doing and experiencing are considered accommodators. They put practiced ideas into action, finding multiple uses for information learned, and are easily adaptive. Those who prefer reflection and thinking are considered assimilators. They see learning experiences as a gateway to larger ideas combining learned information to create models and theories. Those

who prefer doing and thinking are considered convergers. They collect information to solve problems, bringing pieces together to reach a solution. Those preferring experiencing and reflecting are considered divergers. These individuals look at situations from multiple perspectives coming up with alternative solutions by diverging from traditional patterns.

Critical Thinking Disposition, Problem Solving Style, & Learning Style

Past research has shown critical thinking disposition and problem solving style may be linked through creative thinking. Studies have identified creative thinking as an essential part of critical thinking (Maltzman, 1960; Newell et al., 1962; Russell, 1956; Torrance & Torrance, 1973; Vinacke, 1952). At the same time, there is some debate as to whether creative thinking and problem solving are significantly different concepts. Kirton (2003) argued that problem solving style does not differentiate whether an individual is creative or not, but rather the differences in the way they express their creativity. Therefore, if creativity is not the link between problem solving and critical thinking, how are they related? Friedel et al. (2008) found low levels of correlation between critical thinking and problem solving, but concluded the two are probably more independent than previously thought.

Relationships between critical thinking disposition and learning style have also been examined within the field of agricultural education. While studying this relationship in undergraduate students, Rudd et al. (2000) reported no significant correlation between learning style and critical thinking disposition. Torres and Cano (1995) also expressed the need for further study when they discovered learning style only accounted for 9% of the variance in critical thinking ability.

Relationships between problem solving style and learning style were found in the management training context (Kirton, 2000). In these studies reflection was associated with adaptors while action was associated with innovators. If this serves to be true, adaptors will prefer linear learning modes, and innovators will prefer hands on, experiential learning techniques (Kirton). A higher score within each of the three KAI constructs, sufficiency of originality, efficiency, and rule/group conformity signifies an innovative preference, while a low score signifies an adaptive preference towards problem solving.

Purpose and Objectives

The purpose of this study was to describe the relationships between participant's critical thinking disposition, problem solving style, and learning style. The research objectives were to:

1. Describe the participants' critical thinking disposition, problem solving style, and learning style.
2. Describe the relationships between the participants' critical thinking disposition, problem solving style, and learning style.
3. Create a conceptual model describing the relationships existing between critical thinking disposition, problem solving style, and learning style.

Methods

The study presented here was descriptive and correlational in nature. The population used for this study was made up of participants in a three week study abroad course conducted during the summer of 2009 designed to remove them from their comfort zone. When individuals find themselves engaged in unfamiliar activities, coping behavior is activated, creating an environment that relies on preferred cognitive style to develop the needed behavior (Kirton, 2000). In addition, experiential learning was the teaching methodology used, with learning activities designed to stimulate participants possessing a variety of learning styles. The course also included a problem solving activity. Participants were put in to groups to solve an agricultural sustainability problem for a Costa Rican farmer. This was designed to be experiential while engaging the participant's problem solving style. Together, these influences created an atmosphere designed to enhance the use of all three cognitive areas studied. With only 15 participants in the course, a census of the college age students involved was conducted. Due to the small size of the population, the results cannot be extrapolated beyond the limits of the environment described within this study.

Participants met with one of the researchers at the conclusion of the three week course. They were asked to complete two assessments, including Kirton's Adaption-Innovation Inventory (KAI; Kirton, 1976) used to determine their problem solving style and the Kolb Learning Style Inventory (LSI; Kolb, 2007) used to determine learning style. To measure critical thinking disposition, participants completed an online survey instrument. Due to the target population's access to the Internet, the researcher was able to use an online design (Dillman, Smyth, & Christian, 2008). The University of Florida Engagement, Maturity, and Innovativeness test (UF-EMI; Moore, Rudd, & Pennfield, 2002) was used for the study. Permission was granted to modify the original instrument to an online format. Demographic data was also collected online for descriptive purposes.

Instrumentation

To assess critical thinking disposition, the UF-EMI was used. This instrument was made up of 26 Likert-type items measuring the three constructs of critical thinking: engagement, cognitive maturity, and innovativeness (Irani et al., 2007). The total score on the instrument ranges from 26, indicating a low critical thinking disposition, to 130, indicating a high critical thinking disposition. Total reliability for the UF-EMI, as reported by the developers, was a Cronbach's alpha coefficient of .937 (Irani et al.). Cronbach's alpha coefficients for the three constructs within the instrument are: engagement, .906; cognitive maturity, .787; and innovativeness, .797.

The KAI was used to assess problem solving style. The KAI was a 32-item instrument. Reponses were totaled to create an overall score ranging from 32 to 160 (Kirton, 2003). Individuals scoring below 95 points were considered adaptors and those scoring above 95 were considered innovators. The KAI was also made up of three constructs: sufficiency of originality (a preference for forming solutions), efficiency (a preference to use strategy), and rule/group conformity (a preference for structure). Multiple research studies have established a high level of reliability and validity for this instrument (Kirton). In addition, numerous researchers have

replicated high levels of reliability for the KAI, reporting Cronbach's alpha coefficients ranging from .80 to .90 (Taylor, 1989).

Learning style was determined by using the LSI. This 12-item instrument is used to determine learning style preferences within four categories: concrete experience (CE), active experimentation (AE), reflective observation (RO), and abstract categorization (AC). Each category had a score ranging from 12 to 48, with all four categories totaling 120. Categories with higher scores signified preference for this method of learning. Multiple research studies across disciplines have established a coefficient alpha level of reliability for the LSI ranging from .73 to .86 (Ruble & Stout, 1990).

Data Analysis

Descriptive statistics were used to calculate the first objective. Responses for all three inventories were coded for computer analysis using SPSS. Relationships between the participant's critical thinking disposition, problem solving style, and learning style were described by calculating Pearson's product-moment correlation coefficient using Davis' (1971) convention. Magnitude of the relationship is noted by Davis as $.01 \geq R \geq .09$ = Negligible, $.10 \geq R \geq .29$ = Low, $.30 \geq R \geq .49$ = Moderate, $.50 \geq R \geq .69$ = Substantial, $R \geq .70$ = Very Strong. Proportion of the variation accounted for by the relationship is noted by R^2.

Results

Demographics

The 15 participants recruited to take part in this project represented ["university"], the ["university"], ["university"], and ["university"]. Ten of the participants were female and five were male, ranging in age from 20 to 27 years of age. Eleven participants were undergraduate students (73%) and four of the participants were graduate students (27%). Thirteen of the participants were White (non-Hispanic), one was Hispanic, and one was Caribbean.

Critical Thinking Disposition

The UF-EMI inventory was used to identify the participants' critical thinking disposition. The results from the participant's inventories are seen in Table 1. The total score on the instrument ranges from 26, indicating a low critical thinking disposition, to 130, indicating a high critical thinking disposition. Participant scores reflect a range of critical thinking disposition scores, ranging from 92 to 109.

Table 1

Participant's Critical Thinking Disposition

Participant #	Engagement	Cognitive Maturity	Innovativeness	Total Score
3	45	33	31	109
11	46	32	29	107
5	42	34	29	105

10	43	32	29	104
7	42	32	30	104
12	42	32	30	104
17	46	31	27	104
6	41	33	29	103
14	42	30	28	100
2	41	32	27	100
4	40	30	28	98
13	37	30	27	94
9	41	27	25	93
15	38	27	27	92
16	36	28	28	92

Problem Solving Style

The KAI inventory was administered to measure problem solving style. Results can be seen in Table 2. Reponses in each category were summed to create a total score ranging from 32 to 160 (Kirton, 2003). Individuals scoring below 95 points were considered adaptors and those scoring above 95 were considered innovators. Ten participants were identified as innovators and five as adaptors.

Table 2

Participant's Problem Solving Style

Participant #	Inventory	SO	E	R	Total Score
10	Innovator	51	23	51	125
3	Innovator	50	26	47	123
5	Innovator	52	24	44	120
13	Innovator	49	22	39	110
11	Innovator	50	22	39	111
15	Innovator	46	21	39	106
6	Innovator	46	22	40	108
17	Innovator	48	14	46	108
12	Innovator	46	21	40	107
4	Innovator	36	23	42	101
14	Adaptor	35	25	34	94
2	Adaptor	43	10	39	92
7	Adaptor	37	15	33	85
16	Adaptor	36	18	30	84
9	Adaptor	35	16	32	83

Note. SO=Sufficiency of Originality, E=Efficiency, R=Rule/Group Conformity

Learning Style

The LSI was used to measure the participants' preferred learning style. Results from this inventory can be seen in Table 3. The participants represented each of the four categories. Three were identified as accommodating, five as assimilating, four as converging, and three as diverging.

Table 3

Participant's Learning Style Preferences

Participant #	Inventory	AC	AE	CE	RO
13	Accommodating	30	40	31	19
15	Accommodating	16	45	36	24
9	Accommodating	33	33	23	31
16	Assimilating	32	36	28	24
2	Assimilating	25	40	29	26
3	Assimilating	43	20	24	33
6	Assimilating	25	39	30	26
17	Assimilating	45	26	25	24
10	Converging	44	34	21	21
12	Converging	40	33	19	23
7	Converging	40	39	22	19
11	Converging	42	34	26	18
5	Diverging	33	27	34	24
4	Diverging	27	29	32	34
14	Diverging	35	28	31	26

Note. AC=Abstract Categorization, AE=Active Experimentation, CE=Concrete Experience, RO=Reflective Observation

Relationships between Critical Thinking Disposition and Problem Solving Style

There were substantial correlations between participants' critical thinking disposition and their problem solving style (see Table 4). The overall UF-EMI score had a substantial correlation (R = .57) with the overall KAI score accounting for a third of the effect (R^2 = .33). The cognitive maturity construct within the UF-EMI also had a substantial correlation (R = .57, R^2 = .33) with the overall KAI score, the sufficiency of originality construct within KAI (R = .57, R^2 = .33), and the rule/group conformity construct within KAI (R = .58, R^2 = .34). The engagement construct within the UF-EMI also had a substantial correlation with the rule/group conformity construct within KAI (R = .51, R^2 = .26). Two of the constructs within the KAI were substantially correlated to the overall UF-EMI score. The rule group conformity construct had a substantial correlation (R = .58, R^2 = .34) and the sufficiency of originality construct had a substantial correlation (R = .52, R^2 = .27).

Table 4

Correlations between Critical Thinking Disposition and Problem Solving Style

	Overall KAI	SO	E	R
Overall UF-EMI	.57	.52	.23	.58
Cognitive Maturity	.57	.57	.20	.56
Innovativeness	.46	.35	.47	.35
Engagement	.42	.39	.05	.51

Note. SO=Sufficiency of Originality, E=Efficiency, R=Rule/Group Conformity

Relationships between Critical Thinking Disposition and Learning Style

When LSI preferences are viewed in comparison to total scores on the UF-EMI, those exhibiting an accommodating learning style tended to have a low critical thinking disposition score (see Table 5). In addition, those with a converging learning style preference exhibited a high critical thinking disposition score. Those exhibiting either an assimilating or diverging learning style had a range of total critical thinking disposition scores.

Two of the constructs within the LSI had very strong and substantial correlations to the overall UF-EMI score (see Table 6). The abstract categorization construct had a substantial correlation (R = .67, R^2 = .45) explaining almost half of the variance and the active experimentation construct had a substantial correlation (R = -.54, R^2 = .29) to the overall UF-EMI score. In addition, the abstract categorization construct within the LSI had a very strong correlation (R = .72) with the engagement construct within the UF-EMI explaining over half of the variance (R^2 = .52). The active experimentation construct within the LSI also had a substantial correlation (R = -.60, R^2 = .36) with the engagement construct within the UF-EMI.

Table 5

Learning Style Preference Comparisons with Problem Solving and Critical Thinking Scores

Participant #	Inventory Preference	Total EMI Score	Total KAI Score
13	Accommodating	94	110
15	Accommodating	92	106
9	Accommodating	93	83
16	Assimilating	92	84
2	Assimilating	100	92
3	Assimilating	109	123
6	Assimilating	103	108
17	Assimilating	104	108
10	Converging	104	125
12	Converging	104	107
7	Converging	104	85
11	Converging	107	111
5	Diverging	105	120
4	Diverging	98	101

14	Diverging	100	94

Table 6

Correlations between Critical Thinking Disposition and Learning Style

	AC	AE	RO	CE
Overall UF-EMI	.67	-.54	-.10	-.42
Cognitive Maturity	.43	-.35	-.17	-.21
Innovativeness	.45	-.32	-.13	-.32
Engagement	.72	-.60	.00	-.47

Note. AC = Abstract Categorization, AE = Active Experimenation, RO = Reflective Observation, CE = Concrete Experience.

Relationships between Problem Solving Style and Learning Style

When learning style inventory preferences were viewed in comparison to total scores on the KAI, there are no obvious relationships (see Table 5). The total KAI scores varied within each learning style preference. Strong correlations between the participant's problem solving style and the constructs within the learning style inventory were not found (See Table 7).

Table 7

Correlations between Problem Solving Style and Learning Style

	Overall KAI	SO	E	R
Active Experimentation	-.35	-.11	-.38	-.41
Abstract Categorization	.28	.24	.08	.33
Reflective Observation	-.09	-.35	.13	.08
Concrete Experience	.03	-.01	.22	-.10

Note. SO=Sufficiency of Originality, E=Efficiency, R=Rule/Group Conformity

Using the theoretical framework of the cognitive styles identified: critical thinking disposition, problem solving style, and learning style along with the results from this study, a conceptual model representing the relationships between the three styles was developed (see Figure 1). While it may be premature to develop a model based on such a small population, the development process connected the correlations in a visual way. This process also created a unique vision of how cognitive styles relate that can be further tested.

The results show problem solving style is highly correlated with critical thinking disposition. The conceptual model shows those with higher critical thinking disposition scores will most likely be innovators while those with a lower critical thinking disposition score will

most likely be adaptors. Individuals with a higher critical thinking disposition were also correlated to those exhibiting a converger preference when learning while those with a lower critical thinking disposition were correlated with those exhibiting accommodator preferences while learning. The conceptual model reflects this relationship as well. Problem solving style and learning style were not found to be correlated therefore they are only shown to be connected through critical thinking disposition. This study shows how connections between multiple aspects of cognitive style remain hidden until applied to the same group, at the same time, and gives further insight in to the relationships between critical thinking disposition, problem solving style, and learning style.

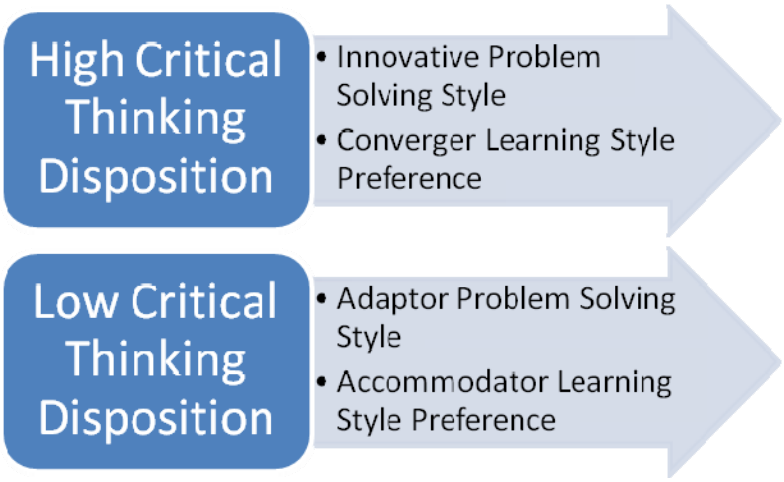

*Figure 1***.** A conceptual model of the relationships between critical thinking disposition, learning style, and problem solving style based on the study.

Conclusions

This study sheds light on how critical thinking disposition, problem solving style, and learning style relate to one another. The main limitation of the study was the use of a census. As such, the results reported were population parameters and cannot be extrapolated beyond the limits of the environment described within the study.

Based on previous research, adaptors would have exhibited a preference for linear learning modes, while innovators should have preferred hands on, experiential learning techniques (Kirton, 2003).While the literature suggested a relationship existed between problem solving style and learning style, the results from the group of students in this study showed a relationship between problem solving style and learning style did not exist.

A relationship did exist between problem solving style and critical thinking disposition in this study. Having only found low levels of correlation between critical thinking and problem solving, Friedel et al. (2008) concluded the two were more independent than originally thought. However, when separate constructs were included in this comparison, it revealed those holding an innovative preference for forming solutions and dealing with structure while problem solving tended to have a higher critical thinking disposition. This is especially true as it relates to the

individual's ability to acknowledge their own predisposition when thinking critically and their ability to recognize how their environment can have an effect on the way they think.

The most unexpected result of the study was the identification of a relationship between critical thinking disposition and learning style. In previous studies, Rudd et al. (2000) found no significant correlations between learning style and critical thinking disposition and Torres and Cano (1995) discovered learning style only accounted for a very small portion of the variance in critical thinking. While the overall critical thinking disposition and overall learning style were not strongly correlated within this study, connections between constructs existed. Those individuals with a strong preference for abstract categorization (thinking) and active experimenation (doing) when learning had a very strong relationship to those who anticipate situations, look for opportunities, and are confident in their abilities when thinking critically.

Implications & Recommendations

The key implication for agricultural educators working to enhance educational programs is to be aware of, and address, the connections between different cognitive dispositions and styles. Critical thinking ability has been recurrently identified as a cognitive style necessary for students to be successful in today's workplace (Myers & Dyer, 2006). This study shows there are connections between innovative problem solvers and a high critical thinking disposition. It also shows those with a strong preference for abstract categorization (thinking) and active experimenation (doing) when learning had a very strong relationship with several critical thinking items. While students exhibiting these characteristics are naturally setting themselves up for success outside of school, educators need to be aware of, and pay attention to the need to stress critical thinking skills with students who do not exhibit these tendencies. If critical thinking skills are demanded by employers, educators need to consider implementing strategies that focus on skills building in this area such as integrating more ill-defined problems in their courses.

Cognitive abilities and preferences are repeatedly taken in to account when creating and revising educational programs to enhance student learning. This study shows innovative problem solvers are highly engaged when asked to critically assess a situation. In addition, these individuals will react to learning strategies targeted at doing and thinking, fitting in with the converging learning style. With a greater understanding of how cognitive dispositions relate to one another, a clearer vision of student preferences and abilities can be taken in to account when creating classroom activities.

Additional research measuring future participant's cognitive abilities in the same study abroad course would assist in determining if the results found here are localized to this population. In addition, research examining whether or not the context of the course had an effect on these relationships could be useful. A similar study conducted with individuals of similar demographic make-up involved in typical, everyday activities would be a way to examine whether or not the influence of the environment had an effect.

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Evaluating Cognitive Relationships: Identifying How Critical Thinking, Problem Solving, and Learning Styles Relate in Agricultural Education

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DISCUSSANT REMARKS

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Over the past several years, numerous individuals have reported results of their research investigating cognitive areas of study at the regional and national AAAE research conferences. As a profession, a body of knowledge has been established, examining critical thinking, problem solving style and learning style. The research has been fundamentally based on theories from work reported by others outside the immediate agriculture teacher education profession. Given this comparison of cognitive relationships, specifically critical thinking, problem solving and learning styles, agricultural educators should be able to establish strategies utilizing cognitive functions to improve the teaching and learning process and ultimately educational programs.

A three week, intense study abroad class that forced individuals out of their comfort zone provided an ideal opportunity for examining how participants respond to a realistic sustainability problem they are likely to encounter. The purpose of this study was to describe the relationships between three measures of cognitive function: critical thinking disposition, problem solving style, and learning style when participants are encouraged to engage in their natural cognitive tendencies by being placed in an intense environment. By design, this was a descriptive and correlational study. Use of instrumentation substantiated in other studies is a strength of this research. Results of the study were limited to the study population; a census of college age students. One might speculate that graduate students are more critical thinkers than undergraduates or that this group is significantly different from other college students because they were motivated to solve international agricultural sustainability problems. Neither may be true. The authors' recommendation to repeat the study with another such class would provide the opportunity to further substantiate or refute the findings.

Results are clearly displayed in tables and clearly explained in the text. Categories of interpretation for the critical thinking scale would be helpful, i.e. is 92 to 109 a moderate to above average range? The model helps the reader visualize the relationships for this group of students and surfaces possible connections for further research. One must remember that the instruments were not just administered to a random group of college students. An experiential, problem solving situation was created for these subjects. What does this mean for teachers creating educational curricula and activities who wish to consider cognitive abilities and preferences? Students in smaller classes, such as honors seminars or senior capstone classes tend to have experiential opportunities where students focus on a problem, work as a group and collectively provide solutions. If the instructor wants all the students to develop high critical thinking skills, not just those who exhibit the innovative problem solving style or converger

Scientific Basis vs. Contextualized Application of Knowledge: The Effect of Teaching Methodology on the Achievement of Postsecondary Students in an Integrated Agricultural Biotechnology Course

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Abstract

The purpose of the study was to compare two teaching methodologies for an integrated agricultural biotechnology course at the postsecondary level. The two teaching methods tested were the explanation of the scientific basis for content (comparison treatment) versus the application of content to a real world agricultural context (experimental treatment). The study was implemented with two different classes over two semesters. The comparison treatment was administered to 22 students during the spring semester of 2009, and the experimental treatment was administered to 16 students during the fall semester of 2009. The research design used was a quasi-experimental non-equivalent control-group design with an identical pre/posttest given to each group as a means of assessing content achievement. Although the experimental treatment, based out of the principles of contextual teaching and learning, did have a greater mean gain on the pre/posttest it was not statistically significant ($p > .05$), so the study's null hypothesis was not rejected. Based on these results, compared with traditional methods, a curriculum of contextualized teaching and learning can be implemented while maintaining a comparable level of student achievement.

Introduction/ Conceptual Framework

What is the function of postsecondary degree programs in the realm of agriculture and agricultural education? Should collegiate degree programs be more concerned with providing scientific content so that students exit with the most amount of information possible, or should they be focused on preparing students for real world problems they will face in the workforce? These are questions that may or may not be specifically answered by postsecondary institutions, but the answers are ultimately evident in the types of students they graduate.

After decades of educational reform, our current educational system at the secondary level is making great attempts to integrate curriculum across disciplines. With different ways to integrate content among and across disciplines, the ideal implementation of an integrated curriculum is unclear. Should agricultural education be treated such that it integrates the scientific concepts of chemistry and biology, or should agriculture be the vehicle that is used to apply the scientific concepts to a real world setting?

An abundant amount of research has been collected on agricultural education in secondary schools with regard to the integration of science. Empirical studies have shown that integration of science and agriculture can positively affect student achievement (Warrick &

Straquadine, 1998). Furthermore, principals (Thompson, 2001), guidance counselors (Dyer & Osborne, 1999), and teachers (Thompson & Balschweid, 2000; Warnick, Thompson, & Gummer, 2004; Wilson, Kirby, & Flowers, 2001) are favorably disposed toward integrating science and agriculture. However, some significant barriers are present that limit large scale, and "ideal" implementation (Myers & Thompson, 2008; Warnick & Thompson, 2007).

At the postsecondary level, there are fewer studies focused on the integration of science and agricultural education. For teacher education programs, this can be a case of "do as we say, not as we do." We cannot expect teachers to employ effective curriculum in the field that is integrated across disciplines and includes collaboration among other teachers, if we do not emulate or model how to do it in teacher education programs (Kluth & Straut, 2003). If agriculture teacher education programs wish to instill good tactics for integrating content in their future educators, then the courses they provide should model effective ways of doing just that.

Literature Review

Educational philosophy

Roberts and Ball (2009) examined the issue of whether agricultural education at the secondary level is *content* that is taught to train agricultural workers, or the *context* with which other disciplines make sense to the learner. The notion that agricultural education is the *content* that is taught is consistent with the model of tech-prep pathways in high school designed to graduate students ready for the workforce. If agricultural education is the *context*, with which other disciplines make sense to the learner, then agricultural education is merely a small piece in a broader integrated picture of an educational system. Their theoretical discussion concluded that modern agricultural education at the secondary level finds basis in both philosophies.

This theoretical discussion is in some ways a continuation of the debate between Charles Snedden and John Dewey. Snedden favored a more vocational type approach to agricultural education that focused on job skills and the training of individuals for the workforce. It was Snedden's belief that vocational and liberal education was not only fundamentally dissimilar, but that the "integration" between the two was counterproductive. Snedden wrote:

> It is further contended that vocational education and liberal education cannot be effectively carried on, so far as regards a given group of pupils, in a way which permits of a considerable blending of the unlike types of instruction. To attempt this is to defeat the aims both of liberal and of vocational training. (Snedden, 1977, p. 43).

Dewey however, viewed agricultural education as a piece of a broader integrated curriculum that students could use to make the connections for greater life skills. Said Dewey, "Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time" (Dewey, 1938, p. 49). Dewey's philosophy is arguably the more prominent of the two in today's secondary agricultural education due to the trend of the agriscience movement, but there is no doubt that remnants of both still exist and influence modern educational theory.

Integrated curriculum in postsecondary agricultural education

To understand how integrated curriculum is conducted at the postsecondary level, it is crucial to first be able to distinguish the different types of integration in practice. Tress, Tress, Fry, and Opdam (2006) identify three popular types of integration as: multidisciplinary, interdisciplinary, and transdisciplinary. Many of the integrated postsecondary courses in operation, including the agricultural biotechnology course this study is associated with employ a multidisciplinary approach. This approach aligns multiple disciplines under a common theme. An interdisciplinary approach is one that crosses disciplinary and scientific/academic boundaries that results in integrated knowledge and theory. The most intense integrated approach is the transdisciplinary approach which brings in the non academic knowledge body to a method similar to the interdisciplinary approach.

Postsecondary programs that realize the benefits of integrated curriculum for students are beginning to institute changes in degree requirements that reflect this trend. North Carolina State University has introduced a degree requirement that mandates students enroll in a specified number of hours from a list of courses that have a focus across multiple disciplines. The rationale for such a requirement is:

> Interdisciplinary study provides students with the opportunity to synthesize knowledge and skills, to make connections between fields of study, to consider more than one disciplinary approach or methodology, and to bring to bear the insights from two or more disciplines in examining and/or responding to complex problems. (Division of Undergraduate Academic Programs, 2008)
> Kozoll and Osborne's study (2004) on the role of science in postsecondary education examined the issue of how science affects, or is incorporated into a student's worldview on society. The researchers demonstrated that science can play a critical role in an integrated curriculum by helping students create a worldview regardless of their career choice.

Contextual teaching and learning in postsecondary education

A trend present at many colleges and universities is the implementation of capstone courses. Capstone courses are often taken during a student's last year of study. These courses "provide an opportunity to incorporate previously learned, often disjointed, information into an interconnected contextual frame of reference from which to transition into a career or further study" (Andreasen, 2004, p. 52). Capstone courses, as argued by Andreasen, should incorporate five main principles: teamwork, problem solving, decision-making, critical thinking, and communication. These five components of a capstone course allow the learner to receive, relate, reflect, refine, and reconstruct the information from the fragmented knowledge of previous courses for a greater understanding.

An example of a capstone course is the Natural Resource Conservation and Management course taught in the College of Agriculture at the University of Kentucky (Arthur & Thompson, 1999). The students call upon their disciplinary knowledge in ecology, sociology, and economics and apply it to real world issues facing professionals in the field and society as a

whole. Efforts such as these are strategies by which postsecondary institutions are demonstrating to their students how years of content-specific course work can be translated into life skills and the foundation for further education.

Capstone courses can provide a way to synthesize and make meaningful a large body of coursework, but the principles of contextualized learning and application can be administered on a course by course basis albeit difficult. In reference to the challenges faced by instructors and curriculum developers to employ contextual teaching and learning, Johnson stated:

> It is to ask far more than, "What lesson shall we place in context?" … or to establish a partnership that puts lessons in a real-world situation… It is to raise the important question: "Into what larger context shall we place this academic lesson?"(Johnson, 2002, p. 17)

Theoretical Framework

Contextual teaching and learning is defined as teaching that enables learning in which pupils employ their academic understandings and abilities in a variety of in- and out-of-school contexts to solve simulated or real-world problems (ERIC Clearinghouse on Adult, Career, and Vocational Education & ERIC Clearinghouse on Teaching and Teacher Education, 1998). More specifically, the authors define contextual learning with certain fundamental characteristics. They assert that contextual teaching and learning: is problem based; occurs in multiple contexts (schools, homes, worksites, communities); fosters self regulated learning; anchors teaching and learning in students' diverse life contexts; employs authentic assessment; and uses interdependent learning groups.

These characteristics of contextual teaching and learning provided the theoretical framework for this study. They were used specifically to develop the curriculum and assessment materials for the application to a real world context treatment that was administered during the fall semester of 2009.

Problem based curriculum

Problem-based learning (PBL) has become a significant component in secondary and postsecondary science curriculums including agricultural related courses. PBL is an approach to structuring the curriculum that involves confronting students with problems from practice which provides a stimulus for learning (Boud & Feletti, 1997). PBL has a particularly prominent footprint in medical schools and other areas where the professionals who are to be graduated are avid problem solvers within their field. The PBL approach is also regarded as the most effective way to teach secondary agriculture (Crunkilton & Krebs, 1992; Newcomb, McCracken, Warmbrod, & Whittington, 2004), thus it is heavily promoted in methods courses for agriculture teacher education programs (Ball & Knobloch, 2005).

When the curriculum contains scenarios in which the students are required to solve real world problems within the framework of learning for the course, postsecondary studies have shown that students have increased levels of achievement (Amador & Gorres, 2004; Finch, 1999).

Self-regulated learning

Self-regulated learning is a component of contextual teaching and learning that pertains to the student taking responsibility in the learning process by analyzing their own cognition and

setting goals for what they need to learn. Lindner and Harris (1992) define self-regulated learning as "the integration and utilization of cognitive, metacognitive, motivational, perceptual, and environmental components in the successful resolution of academic tasks" (p. 1). In a study of over 150 postsecondary students, they found a strong positive correlation between the self-regulated learner and GPA. McCombs and Marzano (1990) discuss that when the learner is aware of the fact that he/she is an agent in their own learning, the processes of metacognition produces self-efficacy and allows the learner to begin to internalize goals.

Authentic assessment

Key to the notion of contextual teaching and learning is the importance of not just how the curriculum is taught, but how the curriculum is assessed. Authentic assessment differs from traditional measures because it requires the application of knowledge to a real world problem or scenario. Wiggins defines authentic assessment as:

> Engaging and worthy problems or questions of importance, in which students must use knowledge to fashion performances effectively and creatively. The tasks are either replicas of or analogous to the kinds of problems faced by adult citizens and consumers or professionals in the field (Wiggins, 1993, p. 229).

Darling-Hammond and Snyder (2000) cite the benefits of authentic assessment for teacher education programs charged with demonstrating proper strategies to future teachers. They highlighted that authentic assessment has the ability to reveal what students understand well enough to apply, and the notion that if you influence the learning of teachers, the learning of their students is influenced as well.

Interdependent learning groups

The traditional postsecondary classroom has long been characterized by "professor-to-student" lecture; a system that embodies independent learning and a responsibility on behalf of the individual to process and learn information. The use of interdependent learning groups is a strategy used by educators to tap into the benefits of social interaction in order to encourage learning in a different way. Skinner, Williams & Neddenriep (2004) argue that when implemented properly, interdependent groups can actually enhance learning due to the effects of reward and reinforcement present in group interaction. This increase in achievement can be associated to the obligation students feel to perform well for others, not just themselves.

Purpose

The purpose of this study was to compare two teaching methodologies for an integrated agricultural biotechnology course at the postsecondary level. The two teaching methods tested were the explanation of the scientific basis for content (comparison treatment) versus the application of content to a real world agricultural context (experimental treatment).

Research Questions and Null Hypothesis

Following, are the research questions used to direct the study.

1. To what extent does the explanation of the scientific basis for content affect student achievement?
2. To what extent does the application of content to a real world agricultural context affect student achievement?

Stated in the null form for the purposes of statistical analysis, the following hypothesis was tested at the .05 level of significance:

HO_1: There is no significant difference in mean gains between the treatment groups as measured by a pre/posttest analysis.

Methods and Procedures

Research design

The research design was a quasi-experimental non-equivalent control-group design (Figure 1). In this study, no formal control group was utilized, instead two treatment groups utilizing different methodologies were compared (Gall, Gall, & Borg, 2003). A quasi-experimental design was chosen due to the inability to randomly assign research participants.

O X O
O Y O

Figure 1- Research design

Key: X= Explanation of scientific basis treatment (comparison) - Spring 2009
Y= Application to a real world context treatment (experimental) - Fall 2009
O= Pretest/Posttest

The two treatment groups received instruction on the same seven "units" of instruction that dealt with environmental biotechnology, and were designed such that they would teach the same fundamental concepts that were assessed in the pre/posttest. These seven units were: environmental impact of agricultural biotechnologies, environmental pollutants, phytoremediation, bioremediation, plant byproducts, animal byproducts, and sustainability. An example of a "fundamental concept" is the different types of bioremediation taught during the bioremediation unit. Both treatment groups received instruction that included the different types of bioremediation. The treatment groups differed in the way the "fundamental" concepts were presented to the learner, and the ways in which they were assessed.

Scientific basis treatment (Comparison) - Spring 2009

The comparison treatment, delivered in the spring semester of 2009, employed a somewhat "traditional" approach to teaching scientific, biotechnology-centered material via distance education. Slideshow presentations were the main vehicle to deliver the instructional content that contained a strong focus on the explanation of biology, chemistry, and basic scientific principles behind the topics covered in each lesson. In the example of the bioremediation unit, this treatment group received an extensive discussion into the types of microorganisms responsible for bioremediation, as well as an in-depth look at the nitrogen cycle, all centered on explaining how the different types of bioremediation work. Instructional slideshow presentations included several links to web pages that engaged students in a "web quest" type approach to covering the material. To ensure students reviewed and understood instructional material and web-based content, students completed study guides and quizzes for each lesson.

Application to a real world context treatment (Experimental) - Fall 2009

The experimental treatment, delivered in the fall semester of 2009 was also administered through distance education, but employed an approach that was based on the critical components of contextual teaching and learning based out of the theoretical framework previously described.

Slideshow presentations were also used as a vehicle to deliver content, but the topics presented were applied to real world situations that highlighted the ways in which the technologies operated in industry. In the example of the bioremediation unit, this treatment group examined the differences between agricultural and industrial type bioremediation, and discussed the ethical concerns associated with genetically modified microorganisms for bioremediation, all centered on showing the practical implications of this technology in the real world. Lessons contained extensive use of video presentations such as "virtual field trips" and "how-to" type documentaries of environmental biotechnologies in a variety of contexts. Instructional activities and assignments included case studies, problem solving scenarios, and team based exercises with several requiring the students to produce things an agriculture teacher would have to create in a job-related scenario. All teaching and assessment materials utilized during the experimental treatment were designed with the components of contextual teaching and learning in mind.

Population and sample

Students enrolled in the AEE/PB/ANS 495 Y course entitled "Agricultural Biotechnology in Today's Society" during the spring and fall semesters of 2009 at [University] were asked to participate in this study. The course was taught both semesters via distance education through the learning management system Moodle. It was cross listed in three different departments (Agricultural and Extension Education, Plant Biology, and Animal Science) within the [College] in order to help attract students in diverse disciplines. Not every student enrolled in the course participated in the study. Although participants and nonparticipants in the study still underwent the same treatment because it was a part of the course itself, participation in the study was voluntary in accordance with IRB regulations due to the need to collect existing academic information. Students were asked for their participation at the beginning of each semester, and only those students who granted permission were included in this study. Total class size for the comparison group was 24 students, while the total class size for the experimental group was 18 students. Two students from each group declined to participate in the study. As such, treatment group samples consisted of 22 and 16 students for the spring (comparison) and fall (experimental) semesters respectively.

The population of this study was students enrolled in the AEE/PB/ANS 495 Y course during spring and fall semesters of 2009 at [University]. Of the 38 students included in the study, 35 were identified as agricultural education majors and 3 were identified as plant biology majors. All three of the plant biology majors were enrolled in the spring 2009 (comparison) group. The course was designed to be implemented with sophomores, but any [University] student was eligible to enroll. A breakdown of each treatment group for the class status of the students can be found in
Table 2. Due to the limited scope and differences in course design, the results of this study cannot be generalized to other postsecondary science/teacher preparation courses.

Table 2

Breakdown of treatment groups by class

Classification	Spring 2009 Comparison Group	Fall 2009 Experimental Group

Freshman	2	0
Sophomore	9	4
Junior	8	6
Senior	3	5
Graduate Student	0	1

Instrumentation

The instrument used to determine achievement pertaining to the content taught to both treatment groups was a twenty five question multiple choice exam given as both a pretest and posttest. The items included in the instrument aligned with the learning objectives of the environmental biotechnology section of the course and covered principles that were common to both treatment groups. The instrument was evaluated by a panel of experts in the field of biotechnology to ensure content validity. Their feedback, along with feedback from a panel of teacher educators who evaluated the phrasing and delivery of questions was used to improve the instrument. The instrument was not pilot tested due to time constraints and the inability to find a group that would perform similarly given the specificity of the questions.

The pretest was administered to both treatment groups prior to exposure of any content covered in the course. Students were not graded for their performance on the pretest, but were given credit for completing it. Students were unable to access the pretest questions after attempting, and were not given the correct answers at anytime. The posttest was given to both treatment groups at the end of the appropriate treatment. The instrument had a .49 and a .30 (KR-20) reliability estimate for the pretest and posttest deliveries respectively.

Data collection

Participants in both treatment groups completed the pretests and posttests in the "quiz" feature within the learning management system Moodle. All grading of the multiple choice questions was completed electronically by the learning management system. Academic information collected on participants in the study included college GPA, high school GPA, high school class rank, and SAT scores. The data was collected during the semester in which the treatment was being administered from the department of registration and records at [University]. The purpose of collecting the indicators of success data were to assess for any pre-existing differences in the treatment groups and to adjust group means based upon any differences found. Data for purposes of analysis was only collected on those students in the course that consented to participate in the study in accordance with IRB regulations.

Analyses of data

Data were analyzed using SPSS. Mean gains in student achievement on the pre/posttest were calculated, and an independent samples t-test was utilized to determine if there was a statistically significant difference between the level of achievement among the treatment groups. T-tests were also performed on college GPA, high school GPA, high school class rank, and SAT scores to see if there were any preexisting differences between the treatment groups. The alpha level was set at .05 for all significance tests. If any significant differences were to be found on the predictors for academic success, an ANCOVA would be utilized to adjust the means to reflect the preexisting differences.

Results

The Impact of Indicators of Student Success on Student Achievement

Several indictors of student success were collected to determine if there were any preexisting differences among the treatment groups that could have had an effect on the assessment performances. These indicators were college GPA, high school GPA, high school class rank, and SAT score. Data on each indicator was not available for every participant. T-tests were performed on each of these indicators between treatment groups, and no significant differences were found (Table 3). Therefore an ANCOVA was not used to adjust means, since there were no significant preexisting differences between the treatment groups.

Table 3

Indicators of Student Success Data

		n	M	SE	*t*	df	*p*
College GPA	Experimental	16	3.10	0.14	0.51	34	.61
	Comparison	20	3.00	0.11			
High School GPA	Experimental	10	4.21	0.11	1.87	24	.07
	Comparison	16	3.88	0.16			
High School Class Rank	Experimental	7	0.14	0.02	2.71	16	.08
	Comparison	11	0.23	0.03			
SAT Score	Experimental	12	1064	37.20	0.70	26	.49
	Comparison	16	1099	32.00			

The Impact of Treatment Methodology on Student Achievement

To test the null hypothesis directing the study, mean achievement scores for the pre and posttest for each treatment group were calculated. The experimental group began their respective curriculum with a mean score of 56.25 on the pretest, slightly lower than the comparison group performance of 59.64. The experimental group finished with a mean score of 86.25 on the posttest, posting a gain of 30 points; while the comparison group finished with a mean score of 86.36, posting a gain of 26.72 points (Table *4*). A t-test showed that even though the experimental treatment had a greater gain score, it was not a significant difference (p=.48). Thus, the null hypothesis was not rejected.

Table 4

Statistics for student achievement by treatment group on the pre/posttest

Treatment Group	*n*	Pretest M	Posttest M	Gain M	SE	*t*	df	*p*
Agricultural Context (Experimental)	16	56.25	86.25	30.00	3.77	0.71	36	.480
Scientific Basis	22	59.64	86.36	26.72	2.79			

(Comparison)

Conclusions

Conclusions were drawn after analyzing the data in the context of the research questions guiding the study: What effect does the appropriate treatment methodology have on student achievement? A curriculum grounded in the principles of contextual teaching and learning did not have a significantly greater gain in pre/posttest scores when compared to the traditional method of delivering an environmental biotechnology course at the postsecondary level. This indicates that the contextualized curriculum performs comparable to the traditional alternative in terms of student achievement.

Discussion

Caution should be used when interpreting the results due to the low reliability of the instrument. However the instrument was content valid, and was designed to measure a very basic level of achievement similar to both treatment groups. A further analysis of the reliability estimates showed that the low reliability of the instrument as a whole can be greatly attributed to a number of non-discriminatory questions that were answered correctly by most students.

Small sample sizes within experimental groups reduce the ability of the researcher to detect differences that may result from a treatment. With small samples the differences have to be much larger in order to reach statistical significance. In this study the experimental treatment posted an advantage in gain scores over the comparison group that could potentially be significant with greater sample sizes.

Nonetheless, the findings of this study are similar to those found in a high school mathematics study designed to test a contextualized curriculum (Parr, Leising, & Edwards, 2009). In the study, the researchers wanted to see how students from an agricultural power and technology course would perform on basic mathematics concepts when they received a contextualized curriculum and an aligned instructional approach. Like this piece of research, the authors found no significant differences between the experimental and "traditional" treatments.

Recommendations for Future Research and Practice

The results of this study show there were no significant differences between the achievement of students in a contextualized curriculum when compared to a traditional design. However, due to this similarity in achievement, it can be seen as the call to implement contextual teaching and learning in postsecondary curriculum. If students are capable of learning the basic scientific content in a contextualized curriculum just as they would have learned it in a traditional manner, then those who are wanting to reap the benefits that contextualized teaching and learning has to provide can implement contextual teaching and learning with more peace of mind that students will still learn the basics.

If teacher education programs wish to instill upon their student teachers the ability to develop contextualized curriculum in classrooms, then they should be effective models themselves. Courses such as the one this study was involved with are good opportunities for student teachers to recognize the importance of contextualized teaching and learning, because

they reap the benefits themselves as a student. More can be done at the postsecondary level with teacher education programs to address this concern.

Further replication of this study with larger class sizes, classes operating during the same semester, and classes at other universities would yield results more generalizable to the typical postsecondary course. If replicated, a preexisting instrument for fundamental biotechnology concepts that has favorable reliability estimates would be preferred.

If contextualized teaching and learning has no significant advantage in improving the achievement of students over the traditional method, then empirical evidence needs to be derived that supports the claim that contextualized curriculum actually improves life skills. Do students who learn content in a contextualized manner outperform those students who learn in a traditional fashion on a performance or problem based assessment? In other words, can students make the connection between the content that is traditionally taught to a real world context, or do they perform better when we as educators make the connection for them?

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Scientific Basis vs. Contextualized Application Of Knowledge: The Effects Of Teaching Methodology On The Achievement Of Postsecondary Students In An Integrated Agricultural Biotechnology Course

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DISCUSSANT REMARKS

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The authors pose an extremely important question in agricultural education: Should collegiate degree programs be more concerned with providing scientific content so that students exit with the most amount of information possible, or should they be focused on preparing students for real world problems they will face in the workforce? The authors established a strong theoretical framework and basis for the research. The purpose of the study was to compare two teaching methodologies for an integrated agricultural biotechnology course at the postsecondary level. The two teaching methods tested were the explanation of the scientific basis for content (comparison treatment) taught during spring semester versus the application of content to a real world agricultural context (experimental treatment) taught the following fall semester. An incredible amount of work was involved to literally create two, on-line courses with the same fundamental concepts but completely different instructional approaches.

The research design was a quasi-experimental non-equivalent control-group design with an identical pre/posttest given to each group as a means of assessing content achievement. The researchers were not able to randomly assign subjects but did test for pre-existing differences between the groups on selected criteria. It is unfortunate that time constraints prevented the researchers from pretesting the instrument. Students with biotechnology minors, in an introductory biotech class or from other disciplines may have helped the researchers develop more discriminating items possibly resulting in the instrument's ability to achieve greater reliability. Can other variables such as when the course is taught or number and class rank of participants per group influence the results? Would there have been a different outcome if the majority of students were basic science students instead of Ag Ed students?

The strategies used to deliver a course via contextual teaching should not be overlooked. Perhaps the most interesting part of the manuscript is the description of prominent features of the contextualized course built for this study. The authors created scenarios for real problem based situations taking place in multiple contexts, comparing agriculture and industry situations. Learners solved case studies, participated in team activities, took virtual field trips and viewed on-line documentaries. They weighed the ethics and controversies of genetically modified microorganisms. How much time was invested in the contextual course compared to the traditional content delivery course? As a distance education course, learners certainly had to self regulated learning. Did delivering this course via distance education present unique challenges? If it is possible to maintain comparable levels of achievement with both basic and contextual

teaching approaches, can and should we teach all science in a contextual manner? The authors are encouraged to share their expertise with others through professional development seminars.

PROFESSIONAL DEVELOPMENT IN-SERVICE NEEDS OF MISSOURI AGRICULTURAL EDUCATORS

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Abstract

The National Research Agenda for Agricultural Education and Communication (Osborne, 2007) states that professional development for agricultural educators is key to improving teacher retention, program continuity, and the preparation of fully qualified and highly motivated agricultural educators. This research investigated the self-assessed, professional development needs of school-based agricultural educators in Missouri using the direct assessment method. Census data were collected with questionnaires administered at area agricultural education teacher meetings and via an electronic questionnaire for those teachers who could not attend those meetings. Results indicated that teachers have the greatest in-service needs in the areas of: laboratory teaching, Missouri agricultural operations, and agricultural mechanics technology. To improve the technical competence of these teachers, Missouri agricultural educators should receive professional development in-service education in these areas. According to literature, Missouri agricultural teacher educators and state agricultural education supervisory staff should develop these professional development in-service education programs and delivery them during technical workshops and summer conferences (Barrick, Ladewig, & Hedges, 1983; *Birkenholz & Harbstreit, 1987*; *Saucier, Schumacher, Funkenbusch, Terry, & Johnson, 2008).*

Introduction and Theoretical Framework

A century ago, school-based agricultural education programs focused on production agriculture with the ultimate goal of preparing students to return to the farm and pursue a career in agriculture (Leake, 1915). Stimson (as cited in Moore, 1988) stated that these programs consisted of classroom lecture, recitation, and manual labor. Over the years, agricultural education programs evolved considerably from production oriented training to consumption based curriculum and courses (Washburn & Dyer, 2006). Agricultural educators of today are faced with the growing challenge of providing a positive learning environment for students and preparing them for productive lives in a fast-paced world (Layfield & Dobbins, 2002). In addition they are encouraged to integrate science, reading, and mathematics curriculum into many of the agricultural education courses that they teach (Washburn & Dyer). The constant evolution of agricultural education programs and the addition of core subject content skills have required many teachers to seek professional development opportunities to meet the demands of the changing emphasis of their programs (Washburn & Dyer).

As the focus of school-based agricultural education programs have evolved, so has the need for professional development opportunities for agricultural educators. Operationally, the purpose of professional development is to provide educators the essential knowledge, skills and technical information required for them to effectively carry out their professional duties and meet the demands of a changing educational environment (Barrick, Ladewig, & Hedges, 1983; Birkenholz & Harbstreit, 1987; Nesbitt & Mundt, 1993; Washburn, King, Garton & Harbstreit, 2001). Historically, professional development has been one of the roles of collegiate agricultural education programs and state agricultural education supervisory staff (Barrick, et al.). The planning and implementation of these professional development opportunities has generally been developed with little input from educators in the field (Washburn, et al.) Traditionally, three predominate methods have been used by agricultural teacher educators and state supervisory staff to determine the in-service needs of agriculture educators: research (Layfield & Dobbins, 2000; Washburn, et al.), personal experiences (Barrick et al.), and informal inquiry with current agricultural educators (Barrick et al.; Roberts & Dyer, 2004).

According to Layfield and Dobbins (2002), a critical factor in developing successful teachers is correctly identifying professional development needs that are in the greatest demand. By understanding the problems faced by agricultural educators, university faculty and state agricultural education supervisory staff can improve professional development programs to address teachers' needs (Mundt & Connors, 1999). Literature suggests that providers of continuing education programs have experienced difficulties in identifying appropriate topics to include in professional development programs (Washburn, et al., 2001). To accomplish this goal, providers of professional development in-service education should monitor the needs of agriculture teachers over time and provide educational programs based upon their current needs (Birkenholz & Harbstreit, 1987). Garton and Chung (1995) concluded that "the in-service needs of agriculture teachers should be assessed and prioritized on a continual basis" (p. 78).

Waters and Haskell (1989) suggest that current educators be included in the process to identify contemporary professional development in-service needs of agriculture teachers. They stated that "gathering data from potential clientele and actively involving them in the process of identifying potential educational programs increases the likelihood of implementing relevant educational programs; thus, increasing the likelihood of achieving appropriate outcomes" (p. 26). Newcomb, McCracken, and Warmbrod (1993) agreed stating "individuals are more motivated to learn when they are actively involved in planning learning activities" (p. 32). In a 2005 study of New York agricultural science educators, researchers found that teachers believed professional development was most meaningful to them when it was personalized to their needs (Park, Moore & Rivera, 2007). When teachers felt engaged, they set their own learning expectations, became interested, and asserted themselves toward changing their teaching practices. By understanding the major problems facing school-based agriculture teachers, teacher educators and state supervisory staff can make improvements in the professional development in-service programs offered to today's teachers (Washburn & Dyer, 2006).

According to Witkin (1984), no one model or conceptual framework for needs assessment has been universally accepted. However, many professional development studies have used the *Borich Needs Assessment Model* (Borich, 1980) to determine the in-service needs of teachers (Garton & Chung, 1995, Saucier et al., 2009). Consequently, little empirical evidence

has proven one method to be superior over another. Witkin (1984) further stated that the educational needs of a group could be better evaluated by using a variety of needs assessment models. To guide this study, the researchers utilized Knowles' (1980) Theory of Andragogy as a theoretical base. This theory states that adults need to know why they need to learn something and become more motivated to learn when they see the need to learn. The theory further states that adults learn experientially, learn as problem solvers, and learn best when the topic is of immediate value to them. Knowles' stated that adults should be engaged in the planning of their own learning experiences. To measure the in-service needs of Missouri agriculture teachers, the researchers utilized the direct assessment method to determine the self-perceived education needs of teachers (Birkenholz & Harbstreit, 1987; Briers & Edwards, 1998). Due to the length of the instrument and the limited amount of contact time that the researchers had with the population, the use of the *Borich Needs Assessment Model* (1980) was not feasible; thus the researchers chose the direct assessment method which allowed agricultural educators the opportunity to have a role in the development of future professional development opportunities.

Ten years have elapsed since the last comprehensive study of professional development in-service needs of Missouri agricultural educators. In previous studies, researchers found that Missouri agricultural educators had in-service needs in the following areas: developing agribusiness management skills, electricity skills, training FFA contest teams, assisting students with SOEP records, completing reports for local and state administrators, motivating students to learn, developing an effective public relations program, preparing proficiency award applications, use of computers, writing grant proposals, attracting quality students, bio-technology applications, and landscaping (Birkenholz & Harbstreit, 1987; Garton & Chung, 1996; King & Garton, 2000). Due to the length of time since those studies were conducted and the continual need for research regarding the professional development in-service needs of agricultural educators (Osborne, 2007), an assessment of current professional development needs of agriculture teachers was warranted.

Purpose and Research Questions

The purpose of this study was to identify the professional development in-service needs of Missouri agricultural educators. The following research questions were investigated to accomplish this purpose:

1. What are the personal and professional characteristics (years of teaching experience, agricultural education district, agricultural education area, sex, FFA membership, 4-H membership, type of teacher certification, major in bachelor's degree, minor in bachelor's degree) of school-based agricultural educators in Missouri?

2. What are the professional development in-service needs of school-based agricultural educators in Missouri related to selected competencies including: curriculum and instruction, technical agriculture teaching topics, student and teacher development, and program management and planning?

Procedures

Population

The population for this study was all school-based agricultural education teachers in Missouri ($N = 467$). Subjects were identified from the 2008-2009 Missouri Agricultural Education Directory (2008) and were confirmed by the agricultural education professional development staff of the Missouri Department of Elementary and Secondary Education, (J. Tummons, personal communication, September 1, 2008). Through this process, 467 teachers were identified as members of the population.

Methodology

The data collection instrument developed by Garton and Chung (1995) was modified for use with this study. The instrument contained two sections. The first section was composed of items describing competencies associated with teaching school-based agricultural education. Those competencies were organized into five constructs: curriculum and instruction, preparation of a career development event team, program management and planning, student and teacher development, and technical agriculture teaching topics. Competencies were identified through a review of relevant literature and from input of a panel of experts. The panel of experts was composed of three university faculty members with expertise in agricultural education, four agricultural education graduate students with prior school-based agricultural education teaching experience, a professional development specialist from the agricultural education division of the Missouri Department of Elementary and Secondary Education and a university faculty member with expertise in research methods and data collection instrument design. Response choices for each item were the following five-point, anchored, Likert-type scale: 0 = no need, 1 = little need, 2 = some need, 3 = much need, and 4 = highest need. The second section of the instrument was designed to collect data related to selected personal and professional demographic characteristics of the respondents. Characteristics investigated were: years of teaching experience, agricultural education district location, agricultural education area location, sex, FFA membership, 4-H membership, type of teacher certification, major in bachelor's degree, and minor in bachelor's degree.

The panel of experts described above was also utilized to determine the face and content validity of the instrument. After implementation of suggestions provided by the panel, the instrument was judged to be valid. A pilot test was conducted to determine the reliability of the instrument. The pilot test group was composed of 20 experienced school-based agricultural education teachers from Missouri who served as mentors in a mentor/inductee program for first and second year agricultural education teachers. Due to their participation in the pilot study, these teachers were excluded from the census. Cronbach's alpha (Cronbach, 1951) was used to measure the reliability of the instrument using data collected from the pilot group. Cronbach's alpha was calculated for each construct in the study yielding the following results: Curriculum and Instruction (.94), Preparation of a Career Development Event Team (.90), Program Management and Planning (.95), Student and Teacher Development (.90), and Technical Agriculture Teaching Topics (.87). These alpha levels were deemed to be acceptable indicators of instrument reliability (Nunnally & Burnstein, 1994).

After the validity and reliability of the instrument were established, the instrument was administered to the population. A census was conducted of all Missouri agricultural educators, excluding the pilot group. The questionnaire was administered at each of the 16 area agricultural education teacher meetings. This stage of data collection resulted in 310 acceptably completed questionnaires, yielding a 69.35% response rate. A second round of data collection was conducted to gather data from teachers who did not attend one of the area meetings. An online instrument, using the same competencies as the paper instrument, was utilized in the second round of data collection and yielded responses from an additional 16.33% (n =73) of the population. The response rate resulting from the two stages of data collection was 85.68% (n = 383). Responses from both stages of data collection were only extrapolated to the respondents of the study and not to the overall population of teachers; therefore, no issues of non-response error were addressed for this study.

Data Analysis

Data relative to all research questions were analyzed utilizing SPSS 17.0 or Microsoft Excel®. Descriptive statistics were calculated for all professional development competencies and demographic characteristics. For research question one, the mean, standard deviation, and range were calculated for the demographic characteristic years of teaching experience. Frequency and percentage were calculated for the remaining demographic characteristics. For research question two, means, standard deviations, and overall rank of in-service need were calculated for each professional development competency. The following anchors were used to describe the means for in-service need: no need = 0.00 – 0.50; little need = 0.51 – 1.50; some need = 1.51 – 2.50; much need = 2.51 – 3.50; highest need = 3.51 – 4.00. Additionally, a grand mean was calculated for each construct using the mean from each competency.

Findings

Findings Associated with Research Question # 1

The average years of teaching experience for Missouri agricultural educators who participated in this study was slightly more than 10 (M = 10.14; SD = 8.29), with a range of experience from 1 year to 38 years. The district with the most respondents was the Central District (n = 85; 22.20%). More respondents were from schools in Area 8 (n = 33; 8.60%) than from any of the other 15 areas. The district with the fewest respondents, compared to the other five districts, was the Southeast District (n = 35; 9.10%). The area with the fewest respondents was Area 12 (n =16; 4.20%). More than 70% (n = 272; 71.01%) of the agricultural educators who participated in this study were male.

A total of 339 (88.50%) Missouri agricultural educators reported that they had been a member of the National FFA Organization. In addition, 222 (58.00%) of the respondents reported that they had been a 4-H member as a youth. Nearly 9 out of 10 (n = 340; 88.80%) of Missouri agricultural educators reported that they had a traditional agriculture teacher certification while only 7.80% (n = 30) hold an alternative agriculture teacher certification. The remaining 30 (3.40%) respondents failed to designate the type of certification that they possess.

Table 1 displays the undergraduate areas of study of Missouri agricultural educators. More than three quarters (n = 293; 76.50%), of the respondents reported that their undergraduate degree major was agricultural education. Additionally, 156 (40.70%) of the respondents reported that they did not have an undergraduate degree minor (see Table 1).

Table 1
Areas of Study for Missouri Secondary Agricultural Educators (n = 383)

Area	*f*	%
Major areas of study		
Agricultural Education	293	76.50
Other	21	5.50
Missing	18	4.70
Animal Science	17	4.40
Agricultural Business	9	2.30
Agronomy	8	2.10
Animal Nutrition	6	1.60
Agricultural Economics	4	1.00
Agricultural Systems Management	4	1.00
Horticulture	3	0.80
Minor areas of study		
None	156	40.70
Missing	62	16.20
Agricultural Economics	44	11.50
Animal Science	25	6.50
Other	22	5.70
Agricultural Business	18	4.70
Agricultural Education	18	4.70
Agronomy	11	2.90
Plant Science	10	2.60
Animal Nutrition	7	1.80
Agricultural Systems Management	4	1.00
Horticulture	4	1.00
Forestry	1	0.30
Turfgrass Management	1	0.30

Findings Associated with Research Question # 2

Alkin (1974) stated that "curriculum consists of the intended learning outcome; the results or the ends of an instructional activity" (p. 43). He described instruction as "the planning and implementation of appropriate strategies for curricular components" (p. 44). The researchers utilized Alkin's definition of curriculum and instruction to describe the construct "Curriculum

and Instruction" investigated in this study. The grand mean for this construct was 2.26, indicating that teachers perceived some need for professional development in-service for this group of competencies. The most highly ranked competency in this construct was "Laboratory teaching practices" (M = 2.58). In fact, that competency ranked highest among the 66 competencies investigated. As shown in Table 2, teachers indicated some need for in-service education for the remaining 10 items in this construct that included topics such as: "Motivating student learning" (M = 2.40), "Integrating science into the agriculture curriculum" (M = 2.31), "Teaching student personal finance" (M = 2.17), and "Teaching decision-making skills" (M = 2.07). The competency with the least need for in-service education in this construct was the competency "Managing student behavior" with a mean of 1.80 (see Table 2).

Table 2
Teachers' Self-Perceived Need for In-Service for Competencies Associated with Curriculum and Instruction (n = 383)

Competency	*M*	*SD*	Overall Rank
Laboratory teaching practices	2.58	0.84	1
Designing curriculum to attract students	2.48	0.91	6
Motivating student learning	2.40	0.96	10
Online teaching resources	2.39	0.96	12
Integrating science into the agriculture curriculum	2.31	1.00	17
Management of instructional facilities (e.g. agricultural mechanics, horticulture)	2.28	0.94	21
Designing courses for alternative credit	2.27	1.09	22
Teaching student personal finance	2.17	0.96	35
Classroom teaching practices	2.15	0.77	36
Teaching decision-making skills	2.07	0.83	46
Managing student behavior	1.80	0.97	60
Grand mean	2.26		

Note. Scale: no need: 0.00 – 0.50; little need = 0.51 – 1.50; some need = 1.51 – 2.50; much need = 2.51 – 3.50; highest need = 3.51 – 4.00.

The construct "Student and Teacher Development" was operationally defined as skills and techniques used and acquired by agricultural educators to accomplish the daily tasks of their position. The grand mean for the construct Student and Teacher Development was 2.21, indicating that teachers perceived some need for professional development in this construct. As shown in Table 3, the competency "Tours of Missouri agriculture" was ranked as the highest in-service education need (M = 2.54) among 11 items included in this construct and was the only item for which teachers indicated much need for in-service education. Of the remaining 10 competencies, respondents rated them as having some need for in-service education. Examples of other competencies included in this construct were "Developing SAE opportunities" (M = 2.43), "Conducting successful FFA chapter activities" (M = 2.28), and "Managing work related stress" (M = 2.20). With each having a mean of 1.92, the competencies "Food for America programs" and "Supervising traditional SAE programs" tied as the lowest ranked competencies for in-service education in this construct (M = 1.92) (see Table 3).

Table 3
Teachers' Self-Perceived Need for In-Service for Competencies Associated with Student and Teacher Development (*n* = 383)

Competency	*M*	*SD*	Overall Rank
Tours of Missouri agriculture	2.54	1.11	2
Tours of American agriculture (other than Missouri)	2.44	1.14	8
Developing SAE opportunities for students	2.43	0.95	9
Conducting successful FFA chapter activities	2.28	1.01	21
Preparing FFA awards/ degree applications	2.24	1.04	28
Supervising non-traditional SAE programs	2.24	1.04	28
Managing work related stress	2.20	1.09	33
Time management (tips and techniques)	2.10	1.03	43
Organizing a FFA Alumni association	2.00	1.10	49
Food for America programs	1.92	0.99	55
Supervising traditional SAE programs	1.92	1.00	55
Grand mean	2.21		

Note. Scale: no need: 0.00 – 0.50; little need = 0.51 – 1.50; some need = 1.51 – 2.50; much need = 2.51 – 3.50; highest need = 3.51 – 4.00.

The construct category "Program Management and Planning" was operationally defined as skills needed by Missouri agricultural educators to plan, manage, maintain, and improve the local agricultural education/FFA program. The grand mean for this construct was 1.89, indicating teachers perceived some need for professional development education. In this construct, the competency "Writing grant proposals for external funding" was the highest ranked in-service education need (*M* = 2.47). Overall, respondents rated 14 out of 16 competencies as having some need for in-service education. These competencies included such topics as "Improving the image of your agriculture program" (*M* = 2.33), "Completing reports for administrators" (*M* = 1.89), and "Establishing an adult agriculture education program" (*M* = 1.79). The competency with the least need for in-service education in this construct was "Effective use of block scheduling" (*M* = 1.23). Table 4 displays the data related to these findings.

Table 4
Teachers' Self-Perceived Need for In-Service for Competencies Associated with Program Management and Planning (*n* = 383)

Competency	*M*	*SD*	Overall Rank
Writing grant proposals for external funding	2.47	1.16	7
Improving the image of your agriculture program	2.33	1.01	14
Creating a FFA chapter website	2.32	1.17	15
Utilizing a local advisory committee	2.09	1.10	44
Developing business/community relations	1.99	0.99	50
Using online FFA resources	1.99	1.04	50
Evaluating the local agriculture education program	1.95	0.94	53
Establishing a working relationship with local media	1.95	1.02	53
Completing reports for administrators	1.89	1.02	58
Middle school classes	1.81	1.09	59
Establishing an adult agriculture education program	1.79	1.15	61
Maintaining a school land lab	1.70	1.26	62
Organizing a local FBMA (Farm Business Management Analysis) program	1.51	1.10	63
Recruiting for Young Farmers/Young Farm Wives	1.42	1.22	64
Effective use of block scheduling	1.23	1.23	65
Grand mean	1.89		

Note. Scale: no need: 0.00 – 0.50; little need = 0.51 – 1.50; some need = 1.51 – 2.50; much need = 2.51 – 3.50; highest need = 3.51 – 4.00.

The construct "Technical Agriculture Teaching Topics" was operationally defined as technical agricultural subject matter that is taught by teachers in Missouri agricultural education classes. As shown in Table 5, the grand mean for this construct was 2.22, meaning teachers perceived some need for in-service education in this area. "Global Positioning Systems (GPS)" ranked as the highest in-service education need in the construct (*M* = 2.54). Teachers rated 3 of the 26 items in this group to be topics in which they have much need for professional development. All other items, which included such varied topics as "Agricultural structures" (*M* = 2.40), "Genetic engineering" (*M* = 2.29), "Show animals" (*M* = 2.11), and "Floral design" (*M* = 2.02), were rated as topics that teachers need some in-service education. The competency "Companion animal care" ranked as the lowest in-service education need in this construct (*M* = 1.91) (see Table 5).

Table 5
Teachers' Self-Perceived Need for In-Service for Competencies Associated with Technical Agriculture Teaching Topics (*n* = 383)

Competency	*M*	*SD*	Overall Rank
Global Positioning Systems (GPS)	2.54	1.04	2
Bio-Fuels	2.53	1.01	4
Biotechnology	2.51	0.99	5
Agricultural structures	2.40	1.09	10
Agricultural mechanics project construction	2.36	1.09	13
Animal reproduction	2.32	1.00	15
Veterinarian assistant training	2.30	1.13	18
Leadership development	2.29	1.00	19
Genetic Engineering	2.29	1.05	19
Natural resource management	2.27	0.99	22
Landscaping	2.27	1.00	22
Renewable energy sources	2.27	1.07	22
Food science	2.25	1.07	27
Greenhouse management	2.24	1.06	28
Electricity	2.23	1.04	31
Small engine technology	2.22	1.11	32
Alternative animal production	2.19	1.01	34
Tractor restoration	2.15	1.24	36
Agricultural communications	2.14	0.92	38
Record keeping skills	2.14	1.02	38
Animal nutrition	2.13	0.89	40
Show animals	2.11	1.09	41
Hot metal work	2.11	1.13	41
Cold metal work	2.09	1.14	44
Floral design	2.02	1.07	47
Plumbing	2.01	1.07	48
Tissue culture	1.99	1.15	50
Companion animal care	1.91	1.09	57
Grand mean	2.22		

Note. Scale: no need: 0.00 – 0.50; little need = 0.51 – 1.50; some need = 1.51 – 2.50; much need = 2.51 – 3.50; highest need = 3.51 – 4.00.

Conclusions, Implications, and Recommendations

Research Question # 1

The typical school-based agricultural educator in Missouri is a male with 10 years of teaching experience. He teaches at a school located in the Central agricultural education district and the Area 8 agricultural education area. As a youth, he was a member of the National FFA Organization and 4-H. In addition, he holds a traditional teacher certification in agriculture and a bachelor's degree in agricultural education. The characteristics of the respondents along with factors such as: location, length of time, time of year, cost, graduate school credit, and use of distance education technology (synchronous and asynchronous) should be considered in developing professional development programs for agriculture teachers.

Research Question # 2

Missouri agricultural educators have the greatest professional development in-service needs in the construct areas of Curriculum and Instruction, Technical Agriculture Teaching Topics, and Student and Teacher Development. Current trends and emerging opportunities related to these general areas should be the focus of in-service education programs for teachers in this state.

The five specific topics in which teachers have the greatest need for continuing education are:

- Laboratory teaching practices
- Global Positioning Systems (GPS)
- Touring Missouri agricultural operations
- Bio-fuels
- Bio-technology

A research based professional development program will result in "an abundance of fully qualified and highly motivated agricultural educators at all levels" (Osborne, 2007, p.20). Based upon the conclusions of this research, several implications must be considered:

1. Interestingly, three of the top five professional development needs identified in this study relate to school-based agricultural mechanics curriculum. Why do teachers feel such a need for professional development related to agricultural mechanics? Has this field of the agricultural education curriculum moved to areas in which teachers have no previous experience? Is the current curriculum different from what middle and late career teachers learned during their pre-service education? Do Missouri pre-service programs adequately instruct beginning teachers in the area of agricultural mechanics? Have too few in-service programs related to agricultural mechanics been offered in recent years for existing teachers? Do teachers in other areas of the U.S. have these same professional development needs? Many of these questions and others should be asked of pre-service and in-service agricultural education programs around the U.S.

2. Literature suggests that the primary responsibility of the agriculture teacher is to provide safety instruction and a safe learning environment for students working in an agricultural education laboratory (McMahon, 1975; Saucier, et al., 2008; Saucier et al., 2009; Strong, 1975). However, several studies, including this one, have indicated that voids exist in the area of laboratory safety (Forsythe, 1983; Jarrett, 1967; Rosencrans, 1996, Saucier et al., 2008, Saucier et al., 2009). If teaching in a laboratory is one of the fundamental instructional methods used in all aspects of school-based agricultural education (animal science, horticulture, agricultural mechanics, food science, etc.), what efforts are being made by teacher education programs to better prepare future teachers for this critical task? Do teachers from other areas of the U.S. have these same professional development needs? What professional development education opportunities are currently offered for existing teachers in other areas of the U.S., who are in need of in-service education in laboratory teaching and management?

3. Concluding a review of literature, teacher educators have identified agricultural mechanics as a vital part of secondary agricultural programs (Burris, Robinson, & Terry, 2005). However, research also supports the point that many agriculture teachers, at all career levels, are in need of continuing professional development in the curriculum area of agricultural mechanics (Swan, 1992; Fletcher & Miller, 1995; Saucier et al., 2008; Saucier et al., 2009; Saucier, Terry, & Schumacher, 2010). Acknowledging the fore mentioned research and the results of this study, what agricultural mechanics courses are required of pre-service teachers within U.S. agricultural teacher education programs? Are these pre-service teachers instructed by agricultural education faculty or are these academic responsibilities conferred to faculty members in other departments? Are pre-service teachers adequately prepared to instruct school-based agricultural education courses?

In the past, so called “travel courses,” where offered as graduate courses from Missouri universities. For a variety of reasons, such opportunities no longer exist. Is there sufficient teacher interest, in this type of professional development program that involves tours, to pay the extra fees required to make them possible? Could the interests and needs associated with such programs be met through virtual tours, such as videos made available online?

According the National Research Agenda for Agricultural Education and Communication, “well designed professional development experiences, based upon teacher career stage, may improve teacher retention and program continuity” (p. 20.). Additionally, literature suggests that “practicing teachers must have continuing access to high quality professional development programs” (Osborne, 2007, p. 20). Acknowledging the work of Osborne and others (Barrick et al., 1983; Birkenholz & Harbstreit, 1987; Saucier et al., 2008; Saucier et al., 2009), it is recommended that studies similar to this one be conducted periodically to ensure the continuing education needs of teachers are met. Recognizing that knowledge and technology related to agriculture constantly evolve and the average years of experience of Missouri agriculture teachers is only 10 years, the researchers recommend that a comprehensive assessment of professional development needs be conducted in each state, every five years.

Literature suggests that one of the primary responsibilities of an agriculture teacher is to provide a safe learning environment for students working in an agricultural education laboratory (McMahon, 1975; Saucier, et al., 2008; Saucier et al., 2009; Strong, 1975). However, due to the lack of recent empirical research concerning agricultural education laboratory safety and the constant need for teacher professional development in this area, the authors suggest that research be conducted to determine the educational needs of teachers concerning laboratory management and the safety of agricultural laboratories.

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Professional Development In-Service Needs of Agricultural Educators

Cliff Ricketts

Professional Development for Agricultural Educators is key to improving teacher retention, program continuity, and the preparation of fully qualified and highly motivated agricultural educators. Over the years, agricultural educator programs have evolved considerably from production oriented training to consumption based curriculum and courses. Therefore, the purpose of professional development is to provide educators the essential knowledge, skills, and technical information required for them to effectively carry out their professional duties and meet the demands of a changing educational environment.

The researchers are to be commended for providing the profession a method to adequately determine professional in-service needs of agricultural education teachers. The four major areas of in-service topics were curriculum and instruction, student and teacher development, program management and planning, and technical agriculture teaching topics. These four areas included 64 topics, with the top eleven professional development in-service topics being:

- Laboratory Teaching Practices
- Tours of Agriculture in State
- Global Positioning Systems
- Bio-fuels
- Bio-technologies
- Designing curriculum to affect students
- Writing Grant Proposals
- Tours of American Agriculture in other states
- Developing SAE opportunities
- Agricultural Structures
- Motivating Students

The population for the study was all school-based agricultural education teachers in the state which totaled 467 participants. A panel of experts determined the face and content validity of the instrument. A pilot test was conducted to determine the reliability of the instrument. Chronbach's alpha was established for each construct, listed earlier, in the study. The total response take was 85.68%. Data relative to all research questions was analyzed utilizing SPSS 16.0 on Microsoft Excel. Descriptive statistics were calculated for all professional development competencies and demographic characteristics.

It is imperative that the profession offers professional development in-service workshops that meet the needs of agricultural educators. Well designed professional development experiences, based upon teacher career stage, may improve teacher retention and program continuity. Finally, I agree with the researcher's suggestions that a comprehensive assessment of professional development needs to be conducted every five years.

Feasibility of using the Modified Matrix as a Method for Developing Workshop Content

Mark Russell, Todd Brashears, Jon Ulmer
Texas Tech University

Abstract

The purpose of this study is to determine the feasibility of using the Modified Matrix as a means for identifying topic areas and critical needs for an educational workshop. Currently, there are little data available identifying methods for identifying critical needs vs. low level needs for workshop development or training programs within the agricultural sector. A Delphi study was conducted to determine content for a workshop on food safety at the pre-harvest level. Researchers utilized industry experts as a means for identifying topic areas for the workshop. Results indicated each area of need (constructs) for the topic areas and ultimately, their level of importance. Based on the performance of participants on a pre-test given at the beginning of the workshop combined with the level of importance of the topic areas, each topic area was labeled as a critical need, low-level need, low-level successful program, or a successful program. Each topic area was graphed using the Modified Matrix, utilizing the scores received for level of importance and student knowledge level from the pretest. Thus, researchers were able to identify critical needs and notify workshop presenters of areas that should be emphasized during the training sessions.

Introduction and Conceptual Framework

Needs assessments have long been an integral ingredient in success of agricultural education and extension education programs. Witkin (1984) cites Kaufman's (1982) article that defines needs assessment as: "…a formal analysis that shows and documents the gaps between current results and desired results (ideally concerned with gaps in OUTCOMES), arranges the gaps (NEEDS) in priority order, selects the NEEDS to be resolved" (p. 14). Witkin and Altschuld (1995) define a Needs Assessment as "a systematic set of procedures undertaken for the purpose of setting priorities and making decisions about program or organizational improvement and allocation of resources. The priorities are based on identified needs." (p.4). A *need* is generally considered to be a discrepancy or gap between "what is," in reference a group or organization and "what should be," or what is desired of the group. A needs assessment seeks to determine the discrepancies, examine the causes of the discrepancies, and then set priorities for what the future action should be when dealing with the gaps within the program (Witkin and Altschuld, 1995). According to Witkin (1984), there is no substitute for a systematic and organized method of assessing needs in order to make decisions about priorities for programs. Witkin also states that quantitative methods must be combined with qualitative methods in order to give a proper balance to the study.

Researchers took the characteristics of a needs assessment into consideration and opted to utilize the Delphi Method as a means for gathering data in a manner that was both quantitative along with traces of qualitative. The qualitative portion of the study takes place in the needs assessment conducted by researchers. Researchers conducted a needs assessment in an effort to determine needs for an educational workshop directed to feedlot management. The workshop

was an integral part of validating the usage of a modified matrix analysis as a needs assessment tool.

The American Association for Agricultural Education National Research Agenda (2007) identified a research priority within the contextual area of Agricultural Education in Domestic and International Settings: Extension and Outreach as Identify the needs and competencies of stakeholders and professional practitioners in non formal agricultural extension education. Figure 1 shows the Model for Workshop Evaluation presented by Russell, Brashears, Brashears, Loneragan, and Miller (2009) as a means for developing and evaluating workshops. The researcher conducting the evaluation begins with by observing and measuring presage variables. These variables are those that are taken into account when a participant enrolls in a workshop. These variables play a role in determining the readiness, motivation, and existing schema of the participants. Additionally, participant attitudes entering the workshop may impact their satisfaction of the workshop. As indicated below, the needs assessment portion is conducted only after considering these presage variables. In order for the workshop to be effective in conveying the interests and needs of the participants, the needs assessment must occur prior to determining delivery format, environment, and presenter effectiveness.

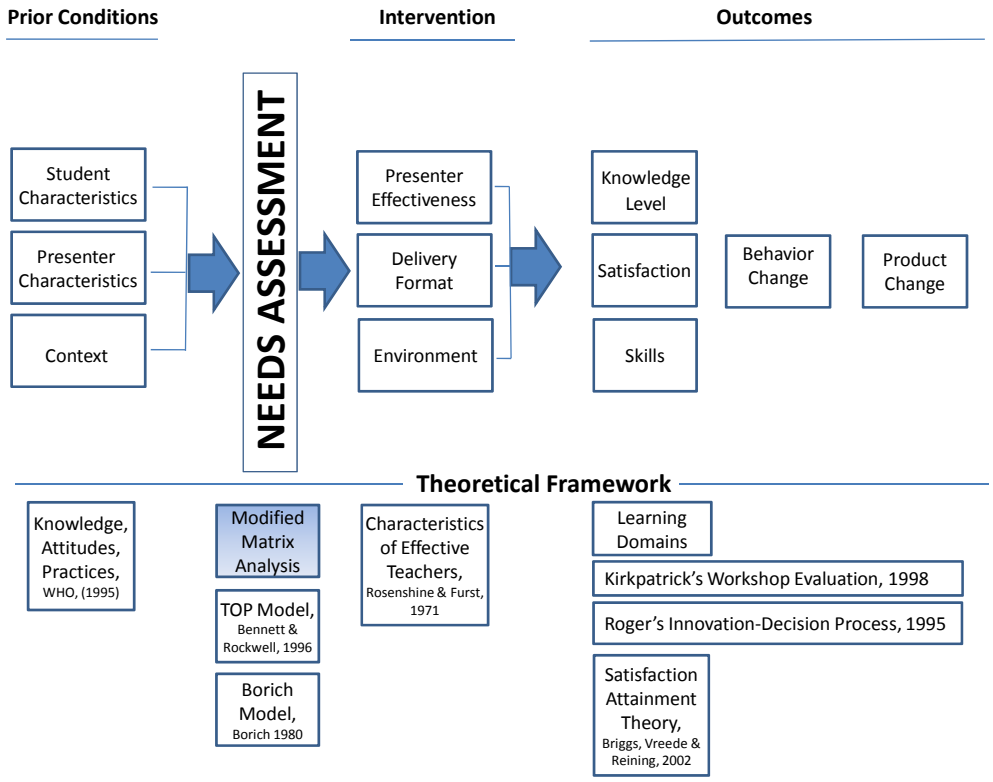

Figure 1. *Model for Workshop Evaluation*

In addition to the model developed by Russell, et.al (2009), Kirkpatrick (2007) recommends some practical approaches to developing an effective training program. One of these recommendations is to ask managers of the participants what knowledge and/or skills they

believe their subordinates need. For the purposes of validating the Modified Matrix, researchers used industry and academia experts in this role. According to Kirkpatrick (2007), this will not only provide crucial information to consider in planning the curriculum for a workshop, but it should also help to create a relationship with the experts in regards to their acceptance and support of the program or workshop. Needs assessments in agricultural education and extension education have a long history of making strong contributions to their respective field. In particular, the Borich (1980) model has served as a needs assessment model utilized for years in the field of agricultural education. The Borich model consists of 5 phases and begins with the creation of competency statements. The competency statements can come from teacher effectiveness studies and/or from the intents and objectives of teacher trainers. The competency statements are used to construct an instrument used for the needs assessment. The second step in the Borich model is to survey the desired population. In this particular step, participants are asked to rate the relevance of given competencies to their career and their current ability of each competency. The third step in the Borich model is to calculate a ranking. For each particular competency, the discrepancy score is calculated across the 3 dimensions: knowledge, performance, and consequence. The discrepancies with the highest positive rank would have the highest priority for revising the training program. The fourth step in Borich's needs assessment model is to compare high priority competencies with training content. For example, when a competency is highly valued but poorly performed, the problem may root from insufficient training rather than ineffective training (Borich, 1980).

There have been several researchers that have utilized the Borich model as a means for conducting a needs assessment. Garton and Chung (1997) utilized the Borich model as a means for conducting a needs assessment for incoming teachers of agriculture. Additionally, Newman and Johnson (1994) also utilized the Borich model in their research titled: *In-Service Education Needs of Teachers of Pilot Agriculture Courses in Mississippi.* Specifically, the researchers sought to involve the learners in the process of planning an in-service educational program (Newman & Johnson, 1994).

Researchers in agricultural education have also utilized the Targeting Outcomes of Programs (TOP) model as a tool for program development and writing objectives in extension education (Bennett, Claude, and Rockwell, 1996). The TOP model (Figure 2) is used in extension to identify and categorize program objectives and outcomes. It consists of 7 levels with inputs along with outputs that take place through Extension programming efforts (Bennett, Claude, and Rockwell, 1996). The inputs are on the left side and outcomes or outputs are set up on the right side. The shape of the model is a hierarchical model of 7 levels. The first and second levels (which begin at the bottom of the hierarchy) are resources and activities. The initial levels describe the things that extension does to produce and conduct activities. Level 3 (participation) through level 7 (social economic environmental conditions) are representative of the outcomes that result from the participation of clientele in Extension programs. Levels 5 (knowledge, attitudes, skills, aspirations), 6 (practices), and level 7 (social economic environmental conditions) are often seen as the 'real' impact levels of the hierarchy. Thus, the TOP model is used to identify the hierarchical level of program objectives for extension education. Once the extension personnel are able to identify at which level the objective is located, they will be afforded a better opportunity to identify appropriate measures of program impact in the evaluation planning process (Bennett, Claude, and Rockwell, 1996).

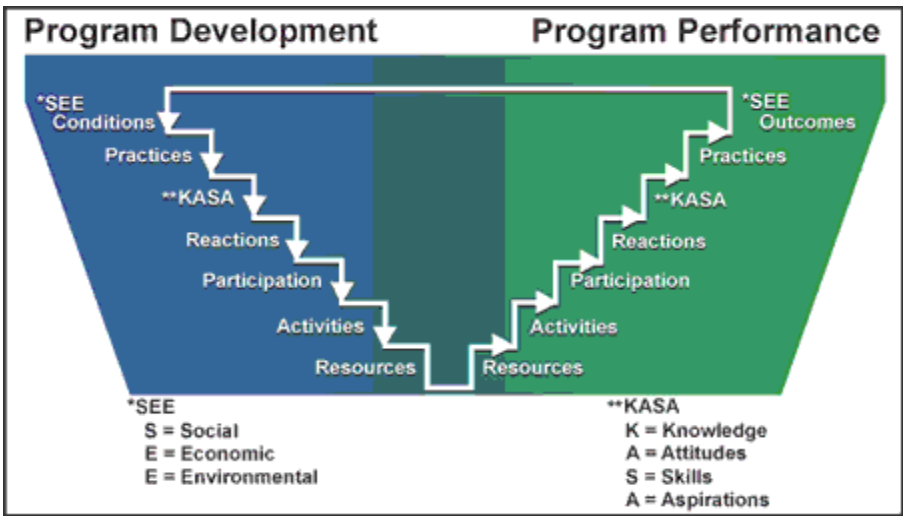

Figure 2. Bennett Targeting Outcomes of Programs (TOP) Model

Witkin (1984) cited a 1973 research report by Hershkowitz that proposes a *criticality function* that uses a 2 x 2 matrix to relate perceptions of goal importance to perceptions of goal attainment. Hershkowitz treated each respondent group separately. Researchers calculated the mean scores of importance and mean scores of attainment to establish criticality levels on the X and Y axes of the graph (Witkin, 1984). The researchers in the current study, the validation of the modified matrix analysis, have replaced the scores of attainment with mean scores of knowledge for the pre-test given to participants at the pre-harvest food safety workshop. Witkin (1984) also explains the functions of Hershkowitz's matrix. She describes it as two criticality levels plotted on a graph and divided into 4 quadrants: (S) successful program (for goals falling above the mean in both importance and attainment; (U) low-level successful program, for goals falling below the mean in importance but above the mean in attainment; (L) low-level need, for goals falling below the mean in attainment; and (C) critical need, for goals falling above the mean in importance but below the mean in attainment. Similar to Hershkowitz's (1973) study, the primary area of focus remains on the critical needs. An example is seen in figure 3.

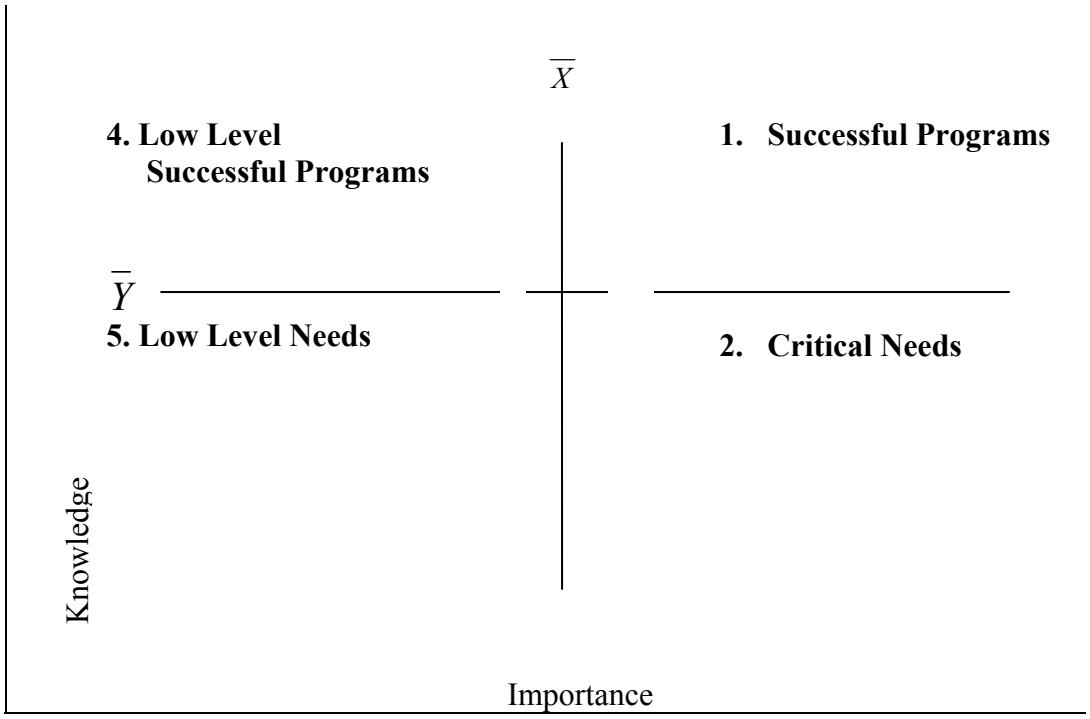

Figure 3. The Modified Matrix Analysis

This particular model has been seen frequently in research within the agricultural education profession. Akers, Miller, Fraze, and Haygood (2004), used the Matrix Analysis proposed by Witkin (1984) as a method for developing critical needs, high level successful abilities, low level needs, and low level successful abilities for their study exploring the importance and inclusion of emotional intelligence in the existing curriculum by agriculture education instructors. Jennings (2006) utilized the Matrix Analysis in her thesis as a means for setting program objectives for her study. Radhakrishna (2000) also utilized the Matrix Analysis as a means for determining critical professional development needs for extension specialists working for Clemson University. This was done while examining 3 constructs: program development and evaluation, research generation and synthesis, and communication and presentation.

However, a possible weakness of the matrix may be that researchers might ask participants to establish the importance of critical items that are beyond their scope of knowledge. Those individuals determining the topics should be individuals with applicable content knowledge.

With the weaknesses and shortcomings found in other needs assessments and program development, the Modified Matrix is identified as a more accurate and complete method of planning a workshop. In an effort to validate the Modified Matrix, researchers combined the Delphi method, Kirkpatrick's workshop development, and Witkin's Needs Assessment as a means for developing the conceptual framework for this study. This study seeks to combine the above items as tool for developing critical needs and content areas for a workshop and eventually validate the Modified Matrix. Thus, researchers propose the Modified Matrix as a means for

conducting a needs assessment for developing workshop content, directed at educating professionals in a specific area.

Purpose and Objectives

The objective of the study is the following:

1. Determine the viability of using a Modified Matrix Analysis as a method of determining critical needs for feedlot managers in the area of food safety.

This needs assessment was one step in developing and delivering a face-to-face workshop during the summer of 2009 in collaboration with the National Cattleman's Beef Association.

Research Methods/Procedures

Population.

The population for this analysis consisted of two independent groups. The first group was involved in completing a modified Delphi study to determine content constructs and to rank them in order of importance. This panel consisted of experts from academia and industry in the area of pre-harvest food safety. There were 12 members of the group that provided content and responded to each round of the Delphi. They were originally nominated by members of the USDA grant that funded this research project. The second group consisted of those individuals who participated in the workshop.

Phase 1. Dephi study to determine content and importance of construct areas.

Step 1: The researchers used a Delphi analysis to determine workshop content areas for this study. A group of 27 experts in the area of beef pre-harvest (live cattle) food safety were identified and contacted for this portion of the study. Of the 27 experts, 12 agreed to participate in the study. These experts represented academia, food safety and the beef cattle industry. The first round of the Delphi commenced on February 26, 2008 with an initial question delivered to the panel using the Zoomerang online survey service. The original question posed to the expert panel was, "What information should be presented to feedlot managers regarding food safety?" The intent of this open-ended question was to determine the most important topics to be presented at a pre-harvest food safety workshop directed to feedlot management. A panel of social scientists analyzed the results of the first round and condensed the comments into 47 curricular constructs. These topics were re-submitted to the panel.

Step 2: The second round consisted of an instrument that included the 47 identified constructs with a 6 point Likert-type scale, beginning with a range of strongly disagree to strongly agree. For each item, the panel was asked to specify their level of agreement for inclusion in the workshop. This step was launched online on May 5, 2008 and remained available until all members of the panel completed the questions.

Step 3: The experts were then asked to review items they chose to include, and to determine if there were any items they would like to reconsider and remove from the workshop. Additionally, the experts were shown the list of items they chose to not include and were asked if

there were any items they would like to reconsider and add to the workshop. Experts were instructed to simply check items they wished to reconsider.

Step 4: Researchers created a final instrument of all included constructs. The panel was asked to rate the accepted items by importance for inclusion in the workshop. This was conducted with a 10-point Likert-type scale. This would be the first component of the modified matrix analysis. Only the 10 highest total scores would be implemented in the workshop. Data collection using this panel was completed in November of 2008.

Phase 2. Multiple-choice test to determine participant knowledge of construct areas.

Time constraints of the two-day workshop led the researchers to only move forward with the ten constructs rated as most important by the expert panel. Multiple choice questions were created (four for each construct) with the help of International Center for Food Industry Excellence (ICFIE) personnel. The questions were reviewed for content validity and pilot tested using graduate students from the Department of Agricultural Education and Communications along with students from the Department of Animal Science from Texas Tech University. The graduate students participating in the pilot test were familiar with pre-harvest food safety issues. Twenty-three feedlot managers and industry professionals participated in the two-day workshop. The participants were instructed to complete the knowledge test at the beginning of the first day. Scores were recorded as correct/incorrect. Each question consisted of four or five possible answers in a multiple choice format. The mean sum scores for each construct resulted in the second component of the Modified Matrix.

Results

The ranked topics from phase 1 of the Delphi study were narrowed to the ten most crucial items to be included, based on the average score each received. The items were ranked by the same twenty-seven industry and academia experts used throughout the entirety of the Delphi study. As previously mentioned, the items were ranked on a 10 point Likert type scale (1= lowest, 10 highest or most important to food safety). These items would become the constructs for the workshop. ICFIE personnel used the ten constructs to develop questions for the pre-test administered at the beginning of the workshop. There were four questions that were eventually developed for each of the ten constructs. The ten constructs are listed in table 1, beginning with the highest rated:

Table 1
Topic Areas and Importance score

Topic Area	Importance Score
1. Reduction of E. coli 0157 H:7 in cattle	8.50
2. Distillers grains	8.50
3. Vaccine control	8.50
4. Other interventions	8.50
5. Transportation, lariage, and food safety	8.43
6. Emerging issues	8.21
7. Importance of food safety	8.21
8. Dust	7.92
9. Overview of E.coli 0157:H7	7.79
10. Overview of Salmonella	7.71

The workshop was conducted on June 17 and 18, 2009 at Texas Tech University. There were twenty-three participants from across the United States. Prior to the workshop beginning, participants were handed a pre-test to determine knowledge level of specific pre-harvest food safety topics. The pre-test consisted of forty questions (ten constructs with four questions for each construct). Participants were allotted as much time as necessary to complete the pre-test. The mean knowledge score for each construct is displayed in table 2.

Table 2
Topic Areas and Knowledge Score

Topic Area	Knowledge Score
1. Reduction of E. coli 0157 H:7 in cattle	1.32
2. Distillers grains	2.24
3. Vaccine Control	2.64
4. Other interventions	1.64
5. Transportation, lariage, and food safety	1.32
6. Emerging Issues	2.04
7. Importance of food safety	2.48
8. Dust	2.64
9. Overview of E.coli 0157:H7	1.64
10. Overview of Salmonella	1.36

These 10 items were then plotted on the modified matrix analysis shown in figure 4. Individual knowledge scores from the participants were plotted on the X axis while the importance scores from the panel of industry experts were plotted on the Y axis. The results of the analysis showed that content areas (1) "Reduction of *E.* coli 0157 H: 7 in cattle using Direct-fed Microbials," (4) "Other Interventions," and (5) "Transportation, Lariage, and Food Safety" were determined to be critical needs. Thus, researchers were able to find an area the demanded the highest amount of attention at the workshop.

In addition, "Overview of E. coli 0157:H7" and "Overview of Salmonella" were found to be a low-level need. Therefore, these areas were devoted a small allotment of time during the workshop in comparison to the critical needs which were discussed at great length. The remaining six constructs identified by the industry panel were covered in the curriculum but only at the cursory level.

It is in this final step of research that sets the Modified Matrix apart from previously used needs assessments and program development models. Researchers can gain a clearer picture of industry needs combined with gaps in knowledge of noted topics by taking a glimpse at the Modified Matrix and making final decisions.

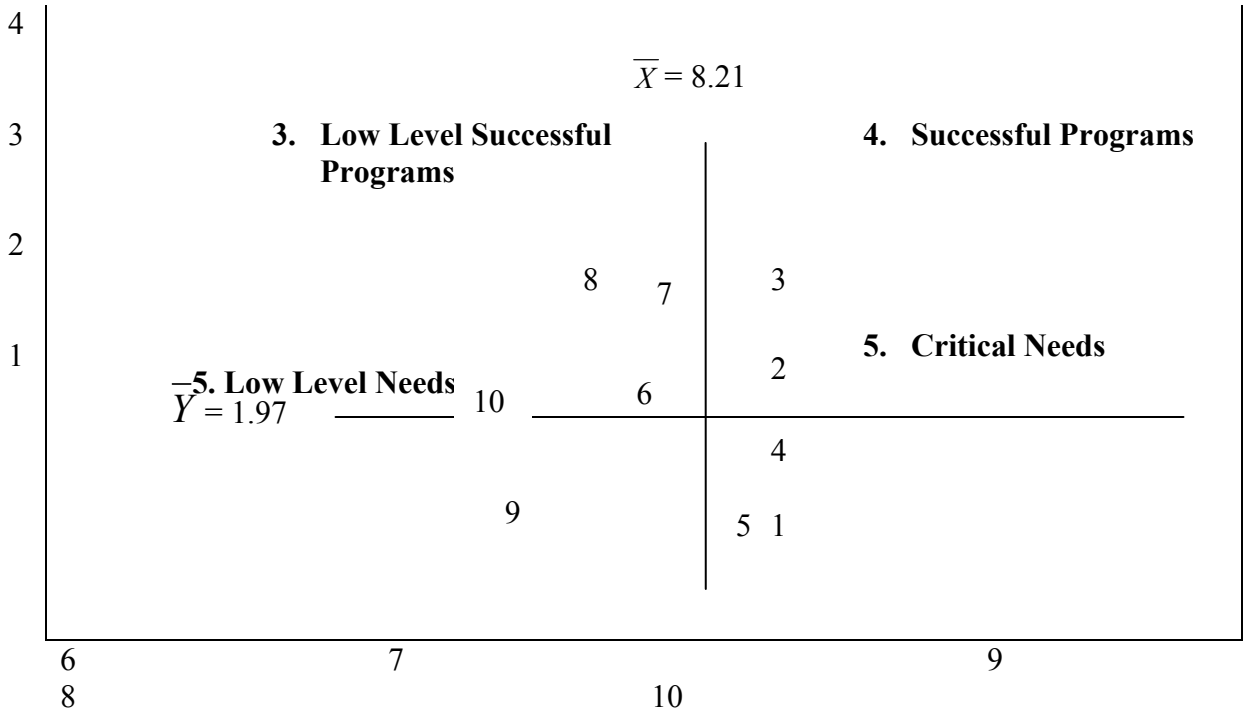

Figure 4. Results of the *The Modified Matrix Analysis*

Conclusions, Recommendations, and Implications

The researchers entered into this project with the intent of developing an accurate method of creating workshop content. Prior needs assessments using the matrix model placed all the responsibility of determining importance and knowledge of the content on the participants themselves. The researchers have developed a method of using the Modified Matrix to determine importance of items from people in the industry who are aware of current trends and issues and can speak to the topic content more effectively than someone on the frontline who may not be aware of new advances in the science of food safety. The participants are then tested on that content and the resulting matrix helps to identify areas of critical need. Workshop content is emphasized or deemphasized based on those results.

The results of this research show that the Modified Matrix can be used to determine critical needs. In this specific case, four construct areas were determined to be critical or low-level needs, thus giving workshop presenters areas of focus. The Modified Matrix is recommended when time is available and outside expert resources are needed to develop and deliver workshop content.

In future efforts, the researchers suggest looking at pretest/posttest scores to determine gain in knowledge immediately following the workshop as well as an extended period beyond to determine retention. Measurements can also be taken to determine additional outcomes of the model for workshop evaluation (figure 1) such as changes in attitudes, skills and behaviors. One recommendation would be to standardize the scale of measurement for both knowledge and importance to make results easier to interpret. Additional testing should take place on future workshops to validate the Modified Matrix as a viable means of conducting needs assessments.

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Feasibility of using the Modified Matrix as a Method for Developing Workshop Content

Cliff Ricketts

The purpose of this study was to determine the feasibility of using the Modified Matrix as a means for identifying topic area and critical needs for an educational workshop. It is modified due to the combination of the Delphi Method, Kirkpatrick's workshop development, and Witkin's Needs Assessment.

The population for this study consisted of two independent groups. The first group was involved in completing a modified Delphi study to determine content constructs and rank them in order of importance. This panel consisted of experts from academics and industry in the area of pre-harvest food safety. Once these answers were evaluated, each topic area was labeled as a critical need, low-level need, low-level successful program, or a successful program. The group went through four rounds (steps) to develop the appropriate instrument.

The second group consisted of those individuals who participated in the workshop. These participants completed a knowledge test at the beginning of the first day. These scores for each construct resulted in the second component of the Modified Matrix. The scores were plotted on the Modified Matrix. This allowed researchers to find areas that demanded the highest amount of attention at the workshop.

The results of this research show that the Modified Matrix can be used to determine critical need. The Modified Matrix is recommended when time is available and outside expert resources are needed to develop and deliver workshop content.

The researchers are to be commended for giving the profession a scholarly method of determining what is to be taught in a workshop by involving industry. Could or should this procedure be used for determining content for selected upper division on graduate courses?

An Analysis of National Agriscience Teacher Ambassadors' Stages of Concern Regarding Inquiry-Based Instruction

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Brian E. Myers, Associate Professor and Associate Chair
University of Florida

Abstract

As teachers are held more and more accountable for the achievement of their students, agriscience teachers must focus on effectively integrating scientific core concepts into agriculture classes. Inquiry-based instruction is currently considered a best practice in increasing students' science content understanding, but is often avoided by teachers who are hesitant about utilizing this form of instruction. The National Agriscience Teacher Ambassador Academy (NATAA) is a professional development opportunity offered to agriscience teachers in an effort to increase their skill at and willingness to incorporate inquiry-based instruction into their classrooms. This study investigates the stages of concern of the 71 NATAA participants through the use of the Stages of Concern Questionnaire in an effort to determine the utilization of NATAA as an effective means of training agriscience teachers to use inquiry-based instruction. Participant responses indicate that the NATAA's training reduces low-level concerns for those who participated for two years instead of one, as well as for teachers who attended the training after its reformatting in 2007. Lastly, results suggest that participants with more than six years of teaching experience are more consistent in their concerns than less experienced teachers.

Introduction

Many educators believe that curriculum integration through inquiry-based instruction is a logical format for effectively teaching today's students due to its similarity to natural human processes. While many high school core content areas are unfamiliar with the practice of curriculum integration, agricultural education has historically included a well-rounded curriculum that teaches the basics of various other subjects through agriculture rules, procedures, and concepts (Shinn et al., 2003). In agriscience classes, biology and science content can be incorporated seamlessly into agricultural principles, provided the teachers are willing and able to do so. Further, the National Science Education Standards promote inquiry-based instruction as a main method to effectively teach science (Keys & Bryan, 2001). However, while the idea of integrating various areas of curricula into different classes through the use of inquiry-based instruction seems like a fluid method of learning, teaching in this fashion proves to be more difficult, and is often associated with many barriers, including successful teacher training (Enderlin & Osborne, 1992). Addressing this need through professional development is thought to be an effective method of disseminating information on the process and practice of inquiry-based instruction to enhance curriculum integration. Although arriving in various forms of workshops, sessions, collaborations, observations, and meetings, professional development in general is considered a keystone in implementing change (Guskey, 1994).

Researchers have identified the need for additional investigation related to the implementation of inquiry-based instruction in the areas of teacher beliefs about inquiry, teacher knowledge base for implementing inquiry, and teacher inquiry practices (Keys & Bryan, 2001). By conducting a study to determine the stage of concern teachers in the National Agriscience Teacher Ambassador Academy (NATAA) feel regarding their competence in utilizing inquiry-based instruction, we can identify key factors as identified in previous research that affect the program's success as a training tool and add to the available literature on the implementation of inquiry-based instruction. Further, we can determine the degree to which this particular method of professional development prepares teachers to utilize inquiry-based instruction in the integration of science curriculum into agriculture classes. If this method is found to be successful, it could be replicated for professional development on other topics.

While the philosophy of curriculum integration is not universally accepted, it has received a great deal of attention in many educational settings (Innovative Teaching Concepts, 1996). Advocates take pride in the philosophy's ability to address curricula in a way that develops student abilities required by everyday life (Innovative Teaching Concepts, 1996). Claimed benefits of curriculum integration include:

1. students seeing relationships among ideas and concepts as they plan;
2. relationships between in- and out-of-school topics becoming obvious to students;
3. the encouragement of students to share ideas;
4. the expansion of peer respect and cooperation through interaction;
5. students becoming responsible for, and engaging in, their own learning; and
6. the development of a sense of community by cooperative student activities (Innovative Teaching Concepts, 1996).

Benefits of curriculum integration in the agriculture classroom can greatly impact high school students. T. Bailey, in *Integral Vocational and Academic Education* states: agriculturally based activities, such as 4-H and FFA, have for many years used the farm setting and students' interests in farming to teach a variety of skills. It only takes a little imagination to think of how to use the social, economic, and scientific bases of agriculture to motivate and illustrate skills and knowledge from all of the academic disciplines (1998, p. 27).

These implications impacted federal legislation; the Carl D. Perkins Career and Technical Education Improvement Act of 2006 states specifically the need for Agricultural Education programs to integrate core academic content into their classes (Heuvel, 2008). Washburn and Myers (2008) reported that some level of science integration was present in 217 Florida high school agriculture classrooms, and efforts to integrate were due to state standards, administrative expectations, the changing nature of the agriculture industry, science credit for agriculture courses, the notion that agriculture classes should be taught via science integration, and the notion that integration increases student learning, enrollment and enjoyment. Six studies cited in research by Myers and Thompson (2009), supported findings that higher student achievement resulted from the integration of scientific principles into agriculture classes.

Currently, there are a number of approaches to attempt the implementation of a successful integration program. Among these, project-based learning (involving inquiry-based

instruction) is a popular example (National School-to-Work Office, 1997). Project-based learning is more student-centered than the traditional classroom, requiring collaboration of teachers and students to develop projects focused on specific occupational issues. For example, a class focusing on occupational safety would develop their own projects and experiments to discover their own answers to questions they have about occupational safety. Teaching science through an inquiry-oriented approach is strongly recommended by both the National Science Education Standards (National Research Council [NRC], 1996) and the Benchmarks for Science Literacy (American Association for the Advancement of Science, 1993).

Both the National Science Education Standards (NRC, 1996) and research conducted by Keys and Bryan (2001) maintain that inquiry-based instruction is not a specific teaching method or curriculum model, but rather a guiding principle on how instruction is delivered. While the National Science Education Standards do not provide specific methods for conducting inquiry-based instruction, they do suggest that learning through scientific inquiry allows students to develop abilities necessary to conduct scientific inquiry, as well as an understanding of scientific inquiry (NRC, 1996). Chiappetta and Adams (2004) also identified several objectives of inquiry-based instruction in the science classroom, including the development of the disposition to ask and answer questions about the natural world and a positive attitude about science, in addition to the two aforementioned objectives identified by the National Science Education Standards (Gengarelly & Abrams, 2008).

Several research endeavors have identified multiple barriers to incorporating inquiry-based instruction in science, and teacher beliefs regarding science, students, and teaching is a common thread between these identified barriers (Keys & Bryan, 2001). Regardless of the general view that inquiry-based instruction can positively impact student learning, Deters (2004) and Windschitl (2004) have observed that teachers oftentimes resist implementation because of their expectancy of undesired consequences. Gengarelly and Abrams (2008) specify some of these undesired consequences as loss of classroom control and safety mishaps. Other teacher concerns include the possibility of longer time requirements, increases in student misconceptions, and subjective grading. Keys and Bryan (2001) also identified teacher perceptions of the rigidity of the scientific method as a barrier to inquiry-based instruction, possibly influenced by a teacher's own lack of inquiry-based exploration (Windschitl, 2004). One of the key sources for these barriers is teacher experience, and these are magnified in less experienced teachers (Crawford, 1999). Teachers relatively new to the profession can lack key knowledge in the areas of pedagogy, content, students, and classroom management, all of which can hinder inquiry-based instruction as a useful teaching tool.

Despite the indication of agriculture teachers' willingness to integrate science curriculum into their classrooms, the previously mentioned barriers hinder the degree to which science integration through inquiry-based instruction is utilized. These barriers collectively seem insurmountable to overcome when implementing inquiry-based instruction; however, they can all be addressed through effective training. Because teacher beliefs influence knowledge focused on, tasks assigned, course content taught, and assessments used, training teachers effectively is imperative when reforming education (Keys & Bryan, 2001). Eick, Meadows, and Balkcom (2005), Windschitl (2004), and Gengarelly and Abrams (2008) have all stated that the successful implementation of inquiry-based instruction in a classroom can be improved through support

provided for the teacher. This notion that training can improve teaching methods is not unconventional; the majority of efforts to reform schools utilize professional development as a means to implement change (Guskey, 1994).

In an effort to better prepare agriscience teachers to utilize inquiry-based instructional methods when incorporating science curriculum into agriculture classes, the National FFA Organization, partnering with DuPont and LabAids, developed the National Agriscience Teacher Ambassador Academy (NATAA) for agriculture teachers. Between 2002 and 2006, the NATAA focused primarily on offering science curricula training to agriculture teachers through the utilization of Lab Aids, as well as showing the importance of promoting careers in science (L. Gossen, personal communication, October 12, 2009). In 2007, the NATAA added a strong focus in inquiry-based instruction to its training, under the idea that classrooms that utilize inquiry-based instruction can potentially improve student understanding of science curricula (Keys & Bryan, 2001). Currently, the NATAA is an intensive week-long professional development opportunity that immerses participants in inquiry-based teaching techniques. The high-intensity format has shown to increase active teacher participation and learning (Garet, Porter, Desimone, Birman, & Yoon, 2001). Sessions are led by nationally recognized experts in inquiry-based teaching techniques and teacher professional development design and delivery. Upon completion of the training, teachers are then referred to as Ambassadors for Agriscience (National FFA Organization, 2009). These ambassadors provide workshops within their states and regions, and lead professional development at the Agriscience Institute, provided for agriculture teachers at National FFA Convention, and the National Association of Agriculture Educators Conference, both held annually. Teachers are permitted to participate in the training for a maximum of two years. Allowing teachers to participate in the training for two years coincides with research that identifies duration as a significant factor in increasing teacher depth of change (Garet, et al., 2001). Additionally, Supovitz and Turner (2000) posit the quantity of training in which teachers participate is strongly linked to inquiry-based teaching practices. The NATAA maintains six objectives:

1. Increase interest in agriscience based educational activities in Agricultural Education programs through the training of, and workshop presentations by, ambassadors.
2. Identify and select agriscience teachers that have a passion for agriscience education, that are effective presenters, that engage students in science based activities, and understand the total program concept for participation in the program.
3. Allow the ambassadors the opportunity to interact with scientists and other personnel from DuPont to more clearly understand career opportunities in all fields of science and to introduce DuPont staff to the NATAA program.
4. Provide interactive classrooms for teacher instruction at the National FFA Convention Career Show and the NAAE National Convention Expo
5. Provide teachers with educational resources, training and information on ways to implement science-based activities in their agriculture classrooms.
6. Share lesson plans, laboratory exercises and teaching strategies between ambassadors in order to improve the resources available for teaching agriscience.

In order to determine how successful a professional development session is in bringing about desired change, a number of factors can be considered. One of these is teacher concern

regarding the innovation, which has been assessed in past research through the Stages of Concern Questionnaire (SoCQ). The SoCQ has been used repeatedly in order to examine teacher concerns across academic settings. In 2004, Christou, Eliophotou-Menon, and Philippou utilized the SoCQ in Cypress to assess the concerns of 655 primary school teachers across 100 schools to determine the success of a mathematics curriculum integration. In this study, researchers found the assessment of teacher concerns to be essential to successful implementation. In 1997, Gwele utilized the SoCQ to assess staff concerns during the implementation of a problem-based learning program in a nursing school. This study supports the use of concerns data to plan staff development.

The SoCQ measures stages of concern regarding an innovation (Hall & Hord, 2006). These stages derive from Francis Fuller's Concerns-Based Adoption Model, which identify the stages of concern as a developmental pathway through which teachers proceed as they implement a change (George, Hall, & Steigelbauer, 2006). The seven stages, shown in Figure 1 (Hall & Hord, 2006), were originally identified through various research endeavors conducted by the staff members of the Research and Development Center for Teacher Education of the University of Texas at Austin in 1969. Innovation users can move through these stages according to their developmental familiarity with the innovation. While this developmental pattern is not a certainty, it remains fairly consistent (George, Hall, & Steigelbauer, 2006).

Stage	Title	Description
6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.
5	Collaboration	The individual focuses on coordinating and cooperating with others regarding the use of the innovation.
4	Consequences	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence.
3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources.
2	Personal	The individual is uncertain about the demands of the innovations, his/her adequacy to meet those demands, and/or his/her role with the innovation.
1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem worried about him or herself in relation to the innovation.
0	Unconcerned	The individual indicates little concern about or involvement with the innovation.

Figure 1: Seven Stages of Concern

A study regarding the stage of concern participants of the NATAA feel regarding inquiry-based instruction can determine the efficacy of the academy in training agriscience teachers to effectively incorporate inquiry-based instruction into their classrooms. Further,

factors including teaching experience, duration of participation in NATAA, and implementation of specific inquiry-based instruction training into the academy can be examined to determine their effect on the program's success. Information gained by investigating this professional development model can be utilized in the development and delivery of professional development for other topics in the profession.

Purpose

Evaluation of this professional development program and key factors identified in previous research that may affect its success can help determine its merit as an effective training tool for agricultural education teachers. The purpose of this study is to determine the stage of concern participants of the NATAA feel toward inquiry-based instruction, and whether their comfort level is affected by the level of involvement they have had in NATAA training.

Objectives

To accomplish the aforementioned purpose, this study has 3 objectives:

1. To determine differences in stages of concern percentiles regarding inquiry-based instruction of participants in the NATAA grouped by number of times they participated in the academy.
2. To determine differences in stages of concern percentiles regarding inquiry-based instruction of participants in the NATAA grouped by NATAA format they attended (before or after its alteration in 2007).
3. To determine differences in stages of concern percentiles regarding inquiry-based instruction of participants in the NATAA grouped by length of teaching experience.

Methods

Participants

To complete the objectives, an email including a survey invitation for The Stages of Concern Questionnaire, designed by George, Hall, and Steigelbauer (2006) was sent to the population of NATAA participants (N=71). According to Dillman, Smyth and Christian (2009), the most effective method of increasing participation rate on internet surveys is multiple contacts. Because little research has been performed regarding the optimal combination of contacts, the number of contacts after the initial invitation is left up to the researcher. However, it is recommended that when response rate per reminder email stalls, the researcher ceases sending reminders. In this study, the original survey invitation resulted in a participation rate of 39% (n=28). Three reminders were sent at one week intervals with respective participation rates of 26% (n=11), 19% (n=6), and 46% (n=12). Overall participation rate was 80% (n=57).

Instrument

To address the objectives, an electronic version of The Stages of Concern Questionnaire, designed by George, Hall, and Steigelbauer (2006) was used. The questionnaire consists of 35 Likert-type questions that assess the respondent's level of concern regarding inquiry-based instruction. An answer of 0 indicates no relevant concern is present, 1 indicates the concern is not true of the respondent now, progressing to 7, which indicates the concern is very true of the

respondent now (Bailey & Palsha, 1992). Additionally, ten demographics questions were added to the questionnaire in order to determine possible relationships between stages of concern and demographic variables. An open-ended question inviting respondent comments on their views of implementing inquiry based instruction was also included, as is recommended by Hall and Hord (2006).

The Stages of Concern Questionnaire was chosen because of its long history of continuous improvement, as well as its high levels of established reliability (Warner, 2009). George, Hall, and Steigelbauer (2006) stated that validity has been tested through calculating the relationships among stages, as well as between stages and variables identified in other concerns theories. In the original validation studies of the SoCQ, "analysis led project members to infer that the seven scales tapped seven independent constructs that could be identified readily with the seven Stages of Concern proposed in the concerns-Based Adoption Model" (George, Hall, & Steigelbauer, 2006, p.14) . Validation of the instrument is provided in its high item correlation with the stage to which the item was assigned (Bailey & Palsha, 1992). Bailey and Palsha (1992) indicated that seventy-two percent of the items correlated more highly with the stage to which they had been assigned than with any other stage. This study also supports the proposed order of the scale, indicating a decreasing correlation between subscales as the distance between them increases. Further, several validation studies stated in George, Hall, and Steigelbauer (2006) indicate that resulting scores followed the Stages of Concern model based on their level of training in the innovation. Coefficients of internal reliability stated in George, Hall, and Steigelbauer (2006) are depicted in Table 1 below.

Table 1.

SoCQ Coefficients of Internal Reliability (George, Hall, & Steigelbauer, 2006)

Stage	0	1	2	3	4	5	6
Alpha	.64	.78	.83	.75	.76	.82	.71

Santos (1999) stated that an alpha score above .7 is acceptable, and each stage of concern, with the exception of Stage 0, meets this criterion. As shown in Table 2, the test-retest correlations reported by George, Hall, and Steigelbauer also fall into this category, again with the exception of Stage 0. Stage 0 is currently under revision to improve its reliability (George, Hall, & Steigelbauer, 2006). Cronbach's alpha was calculated *post hoc* for the overall use of the SoCQ and was found to be .90. Following the guidelines set forth by Santos (1999), this was deemed acceptable.

Table 2.

SoCQ Test-Retest Correlations (George, Hall, & Steigelbauer, 2006)

Stage	0	1	2	3	4	5	6
Alpha	.65	.86	.82	.81	.76	.84	.71

Data Analysis

Upon completion of data collection, responses were analyzed using the calculations recommended by George, Hall, and Steigelbauer (2006) and developed in Excel format by Scott and Persichette (2006). Raw scores in each stage of concern were averaged and analyzed by different groupings according to variables identified in the objectives. In order to perform accurate analysis, average raw scores in each stage of concern were converted into percentile scores. The 2006 Stages of Concern Questionnaire publication by George, Hall, and Steigelbauer, as well as the Excel program, provides the raw score-percentile conversion chart. This percentile chart was utilized throughout the previously mentioned validation studies, and has proved to be representative of various innovations (George, Hall, & Steigelbauer). When analyzing percentile scores, the higher the score, the more intense the concerns are at that stage. Because percentile scores in each stage of concern are dependent on one another, analysis through a concerns profile, which maps out an individual's or group's concerns, is the most interpretive and most frequently used method for analyzing SoCQ data (George, Hall, & Steigelbauer).

Results

Demographics

Out of the 57 respondents, 17.5% have between one and five years teaching experience (n=10), 33.3% have been teaching for between six and ten years (n=19), and 40.1% have been teaching for over 10 years (n=23). Over half (59.6%) of the respondents attended the NATAA training for one year (n=34), while 40.4% attended the training for two years (n=23). Regarding attendance before or after the alteration of the NATAA in 2007, 40.4% of the respondents participated in NATAA training before 2007 (n=23), while the remaining 59.6% participated after the training's alteration.

Number of Years Participated

Figure 2 below compares the compiled percentiles in each stage of concern for respondents who participated in the NATAA training for one year with those who participated for two years. Respondents who attended one year of NATAA training had most intense percentile scores in Stage 0, which indicates that there are a number of initiatives, tasks, and activities that are of concern to this group of people. Their lowest score in Stage 4 suggests that this group has minimal concern about the effects of inquiry-based instruction on students. While the respondents who attended two years of NATAA training share this low level of Stage 4 concern, this group's highest percentile in Stage 5 suggests concerns about working with others in relation to use of inquiry-based instruction. These two groups share similar profile patterns, except with regard to Stage 0, indicating that the group with two years of training is less concerned with other innovations than those with one year of training. The profiles for both groups display a tailing-down effect at Stage 6 (Refocusing), which indicates group willingness to change; respondents do not have ideas that would potentially compete with the implementation of inquiry-based instruction (George, Hall, & Steigelbauer, 2006).

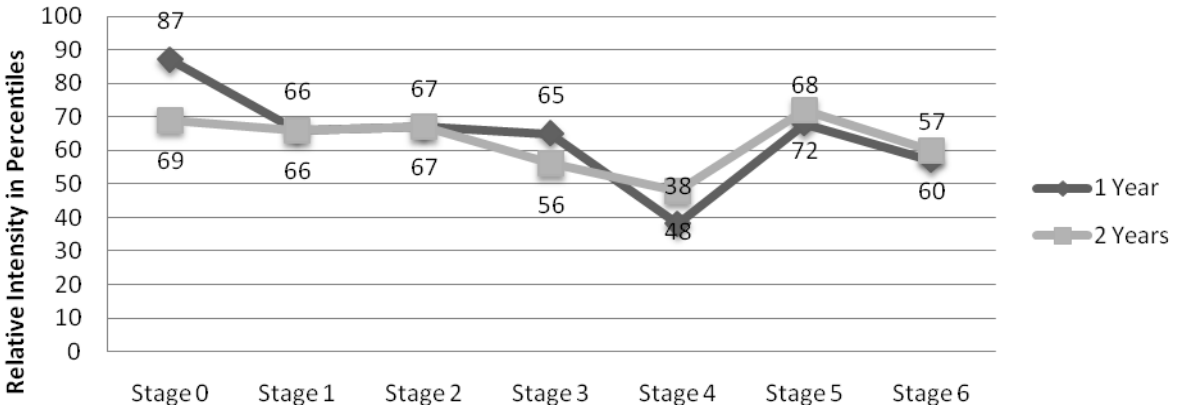

Figure 2. SoC Profile of NATAA Participants According to Number of Years Participated *NATAA Format*

In order to determine any difference in the effect of incorporating inquiry-based instruction training into the NATAA on participant stage of concern, results were grouped according to the year each respondent participated in the training in Figure 3. The following concerns profile compares overall percentile scores in each stage of concern between respondents participating in NATAA training between 2002 and 2006 and those participating in NATAA training between 2007 and 2009.

Both profiles display highest percentile scores in Stage 0, which indicates that there are a number of initiatives, tasks, and activities that are of concern to the groups. This stage does not indicate the degree to which individuals in each group are using inquiry-based instruction. The next highest percentile score for 2002-2006 participants is in Stage 1, which indicates that these individuals would like more fundamental information about inquiry-based instruction. The second highest percentile for 2007-2009 participants is in Stage 5, which indicates individuals are focused on coordinating and cooperating with others regarding use of inquiry-based instruction. This difference in second highest stage scores indicates that most individuals participating in NATAA training after its reconstruction in 2007 are more concerned with collaboration in inquiry-based instruction and less about general information regarding inquiry-based instruction than 2002-2006 participants. Again, both group profiles tail down at Stage 6. This indicates willingness to change, regardless of which NATAA training format participants attended. Lastly, the difference between 2002-2006 participant first and second percentiles is 19 points, indicating a great distinction between intensity of concern at these stages, while the respective difference in 2007-2009 participant scores is three points, indicating they are almost equally concerned with collaboration of inquiry-based instruction as they are with other initiatives.

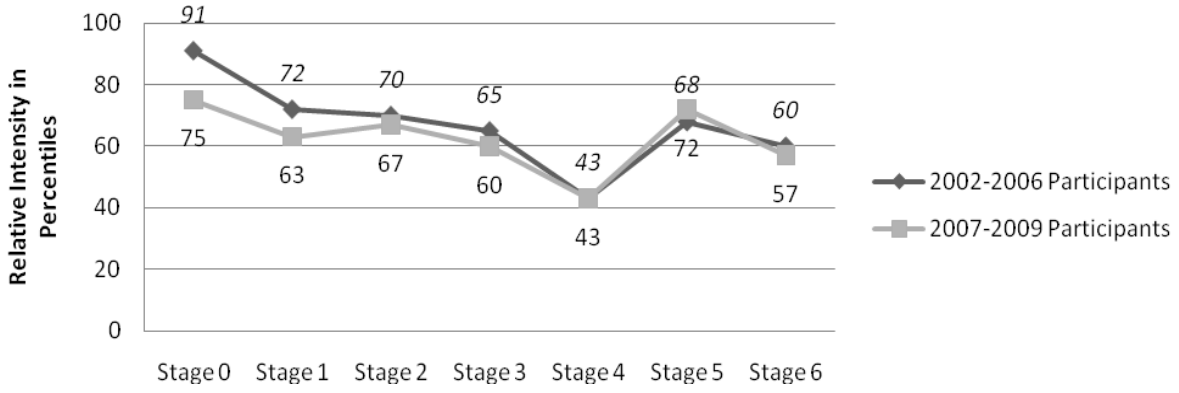

Figure 3. SoC Profile of NATAA Participants According to Date of Participation

Years of Teaching Experience

Figure 4 below displays differences in percentile scores in each stage of concern between respondents with teaching experience between one and five years, those with teaching experience between 6 and 10 years, and those with over 10 years teaching experience.

Each group's percentile profile follows a similar pattern. Stage 0 percentiles are highest for all three groups, indicating that all groups feel that there are a number of initiatives, tasks, and activities that are of concern. The tailing-down at Stage 6 for each of these groups, like in the previous results, indicates that respondents in each group display willingness to change. Top three highest stages of concern are Stages 0, 2, and 1 respectively for both groups with teaching experience over five years. This indicates that these two groups hold similar concerns regarding inquiry-based instruction. However, the difference between the first and second highest percentiles of participants with over ten years teaching experience is greater than the respective difference of percentiles of participants with six to ten years experience, indicating that teachers with greater than ten years teaching experience have greater distinction between their concerns with other tasks and initiatives and their concerns with personal and informational aspects of implementing inquiry-based instruction.

The profile of participants with between one and five years teaching experience shows more variation than those of the other groups, suggesting that the intensity of different stages of concern varies more among individuals. Additionally, this group's second highest percentile is in Stage 5, indicating they have intense concerns regarding the coordination and cooperation of others when implementing inquiry-based instruction. Lastly, the *negative one-two split* shown between Stages 1 and 2 suggests that this group of teachers may have doubts and potential resistance to an innovation. This *split* indicates that concerns about the effect of inquiry-based instruction on job security may be greater than the desire to learn more about its implementation.

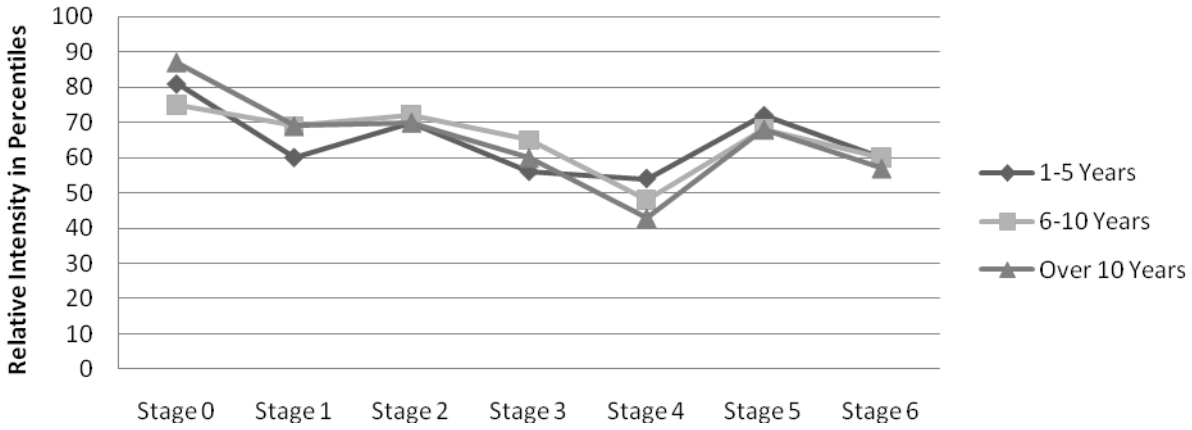

Figure 4. SoC Profile of NATAA Participants According to Length of Teaching Experience

Conclusions

Individuals who participated in two years of NATAA training were most concerned with issues related to collaboration, while individuals who participated in one year of training were most concerned with issues pertaining to a variety of tasks and innovations. Individuals usually move through the five developmental stages in the SoC model and user concerns move toward higher-level stages with time, successful experience, and the obtaining of new knowledge and skills (George, Hall, & Steigelbauer, 2006). Because the NATAA is designed to provide agriscience teachers with new knowledge and skills in inquiry-based instruction, as well as opportunities to develop their skills, it can be suggested that an increase in NATAA participation from one to two years resolves low-level, self-related concerns regarding inquiry-based instruction. Similarly, an increase in NATAA training also increases the ability of agriscience teachers to focus on higher-level, impact-related concerns that typically appear only after lower-level concerns have been resolved. This conclusion supports previous research that identifies the quantity of training as a factor affecting beliefs about inquiry-based teaching practices (Supovitz & Turner, 2000).

With regard to groups participating in NATAA training before or after its alteration to include development of inquiry-based instruction methods, both groups have intense concerns related to a number of task initiatives. However, differences between the first and second highest percentiles of the group participating before and after the academy's alteration in 2007 are 19 and three respectively, suggesting that the academy version that includes specific training on inquiry-based instruction serves to alleviate the low-level, self-related concerns of some individuals and allow more individuals to identify concerns at a greater variety of levels. Stages showing second highest percentiles for each group (Stage 1 for those participating in the training before its alteration compared to the second-most intense Stage 5 concerns of those participating in the training after its alteration) further confirm this conclusion that the current NATAA training serves to resolve low-level concerns and increase the ability of agriscience teachers to focus on emerging higher-level concerns regarding inquiry-based instruction.

Profile variations according to length of teaching experience indicate differences between teachers with less than six years experience and those with greater than five years experience.

Teachers with between one and five years experience display greater variety in their intensity of stages of concern, suggesting that their concerns are less uniform and therefore may require more time, experience, or training to address all concerns which is congruent with research suggesting newer teachers need to gain more experience before being able to successfully utilizing inquiry-based instruction (Crawford, 1999).. Additionally, this group displays a *negative one-two split* between Stages 1 and 2, which indicates that these individuals are concerned about how the implementation of inquiry-based instruction may affect their job security. Past research states that no relationships between years of teaching experience and stages of concern have been discovered (George, Hall, & Steigelbauer, 2006). However, this research suggests that while length of teaching experience may not have a direct affect on the efficacy of NATAA training, associated variables, such as tenure, current economic climate, and job security may cause some influence on the concerns of teachers with less than six years experience regarding implementing a new innovation, and may therefore cause an indirect effect on the efficacy of NATAA training.

Recommendations

The NATAA is a collaborative effort between various entities, including the National FFA Organization, DuPont, and LabAids. Due to the value of the time and resources of all parties involved, efforts should be made to maximize the academy's utility and efficacy. Results of this study conclude that the NATAA may have a positive effect on the concerns of agriscience teachers regarding inquiry-based instruction. NATAA participation appears to resolve low-level, self-related concerns and allow teachers to focus on higher-level, impact-related concerns that usually emerge after lower-level concerns are alleviated. The increased focus on enhancing skills to utilize inquiry-based instruction seems to heighten this effect, as does increasing length of participation in the training from one to two years. Therefore, the NATAA should investigate the possibility of offering increased opportunities for teachers to participate more than two times, hopefully enhancing this increased understanding of inquiry-based instruction further. Additionally, NATAA instructors should continue to focus on inquiry-based instruction training, as well as consider methods to improve the depth of knowledge and skill offered in this area. Lastly, inconsistency of concerns of teachers with less than six years teaching experience suggest that current NATAA training methods may not be as effective with this group as they are with more experienced teachers, whose concerns are more predictable and consistent. Therefore, it is recommended that the NATAA contributors maximize their efforts by focusing on training teachers with at least five years teaching experience. Through this narrowing of participant criteria, the NATAA can focus more on concerns that affect a large number of participants who are more likely to implement inquiry-based instruction.

Professional development can be costly for many parties due to constraints in funding, time, and resources. This study serves to further solidify the NATAA as an effective, valuable method of training teachers to utilize a current best practice in teaching science through agriculture. Subsequent research on the various effects and practices of NATAA, including efficacy of participants leading teacher training, can add opportunity for the academy to improve methods and practices in training teachers to incorporate science in their classrooms through inquiry-based instruction. Findings from further study can also be utilized to identify factors of the NATAA that increase teacher understanding and change. These factors can then be implemented in various training opportunities, both being offered through the NATAA and other

training vehicles, to increase teacher depth of change and understanding in many development areas.

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An Analysis of National Agriscience Teacher Ambassadors' Stages of Concern Regarding Inquiry-Based Instruction

Cliff Ricketts

Inquiry-based instruction is a teaching technique in which teachers create situations in which students are solving problems. Lessons are designed in that students make connections to previous knowledge, bring their own questions, and design ways to try out their ideas. The science education community has embraced no idea more widely than inquiry-based institution. Inquiry-based instruction is the creation of a classroom where students are engaged in essentially open-ended, student-centered, hands-on activities.

As teachers are held more and more accountable for the achievement of their students, agriscience teachers must focus on effectively integrating scientific core concepts into agricultural classes. Inquiry-based instruction is ensuring student's science content understanding, but it is often avoided by teachers who are hesitant about utilizing this form of instruction. In an effort to better prepare agriscience teachers to utilize inquiry-based instructional methods when incorporating science curriculum into agricultural classes, the National FFA Organization, partnering with DuPont and LabAids, developed the National Agriscience Teacher Ambassador Academy (NATAA) for agricultural teachers.

The purpose of this study was to determine the stage of concern participants of the NATAA feel toward inquiry-based instruction, and whether their comfort level is affected by the level of involvement they have had in NATAA training. Evaluation of this professional development program can help determine its merit as an effective training tool for agricultural education teachers. To complete the objectives, an email including a survey invitation for The Stages of Concern Questionnaire was sent to the population of NATAA participants (N=71). To address the objectives, an electronic version of The Stages of Concern Questionnaire was used. The questionnaire consists of 35 Likert-type questions that assess the respondent's level of concern regarding inquiry-based instruction.

Individuals who participated in two year NATAA training were most concerned with issues related to collaboration, while individuals who participated in one year of training were most concerned with issues pertaining to a variety of tasks and innovations. Individuals usually move through the five development stages in the SoC model and user concerns move toward higher-level stages with time, successful experiences, and obtaining of new knowledge and skills.

Results of this study conclude that NATAA may have a positive effect on the concerns of agriscience teachers regarding inquiry-based instruction. NATAA participation appears to resolve low-level, self-related concerns and allow teachers to focus on higher-level, impact-related concerns that usually emerge after lower-level concerns are alleviated. The NATAA should investigate the possibility of offering increased opportunities for teachers to participate more than two times, hopefully enhancing this increased understanding of inquiry-based instruction further.

Due to inconsistent results of participants, it is recommended that the NATAA contributors maximize their efforts by focusing on training teachers with at least five years teaching experience. This reviewer agrees with the researchers that this study serves to further solidify the NATAA as an effective, valuable method of training teachers to utilize a current best practice in teaching science through agriculture. The researchers are to be commended for their efforts with this study.

IDENTIFYING CONCERNS OF PRESERVICE AND INSERVICE TEACHERS IN AGRICULTURAL EDUCATION

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Abstract

Teacher educators have the difficult task of determining what skills are most needed by preservice students and in-service teachers. A successful balance identifying student concerns and addressing educational needs can be the key to encouraging retention in these teachers later on. The purpose of this study was to describe teacher concerns over different stages of teacher development. A three part instrument that consisted of a teacher concerns statement, a likert-type scale of concerns identified through agricultural education research and demographic data was given to three different groups. The groups consisted of early career teacher education students (N = 40), advanced teacher education students (N = 15), and teachers who had completed their first year of teaching and were just beginning their second year (N = 22). The results of this study indicate that concern levels do change over time and there is a distinct shift in both the level and type of concerns across these three groups. This shift may allow for agricultural education courses to be more uniquely catered to the specific needs and concerns of our educational clientele.

Introduction

One of the challenges experienced by teacher educators is providing students and teachers with the necessary skills that they need to be successful in the classroom. By identifying the concerns of students and teachers, instructional content can be designed, selected and sequenced based on students needs (Hillison, 1977). Fuller (1969) suggested that by identifying the concerns of students in teacher education programs and developing educational materials to address these concerns, the motivation of learners is increased and will positively influence student learning.

Significant research has been conducted in the education field to identify the problems faced by teachers. Veenman, (1984) conducted a thorough examination of education research and identified 91 studies that involved early career teacher concerns. Within these studies, Veenman identified the most frequently reported problems for beginning teachers as classroom discipline, motivating students, dealing with individual differences, assessing student work, relationships with parents, organizing class work, insufficient supplies, dealing with individual student problems, insufficient preparation time due to high teaching loads, relationships with colleagues, planning lessons and the effective use of different teaching methods

In agricultural education, teacher concern studies have yielded similar findings (Boone & Boone, 2007; Edwards & Briers, 1999; Garton & Chung, 1997; Joerger, 2002, Mundt, 1991; Myers, Dyer & Washburn, 2005; Talbert, Camp & Heath-Camp, 1994; Warnick, Thompson, & Gummer, 2007). However, problems of early career agricultural teachers can be further complicated by the extra responsibility for managing Supervised Agricultural Experience (SAE) projects and the development of the FFA chapter. Johnson, Lindhardt, and Stewart, (1989) found that first and second year teachers placed the greatest importance on the three traditional

components of the agricultural education program: instruction, FFA and SAE. This may lead to increased stress as new teachers try to balance the demands of teaching with the pressure to incorporate the total agriculture program into their classrooms. Myers et al. (2005) identified eleven major problems faced by beginning agricultural teachers and of the top five problems, three were directly related to the development of the FFA program (organizing an effective alumni chapter, organizing and planning FFA chapter events and activities and recruiting and retaining alumni members). In regards to preservice teachers, Fritz and Miller (2003) found that student teachers were similarly concerned with classroom instruction and management, student discipline, and time management. Hillison's (1977) research showed that preservice students identified a higher number of educational concerns then first year agriculture teachers. Hillison also found a significant difference among concerns scores between males and females.

These areas can contribute to the many problems identified as reasons why teachers choose to leave the classroom. One recent study by Ingersoll (2001) estimated that almost a third of teachers will leave the profession in the first three years and that half will leave after five years based on the 1999-2000 school year. This research identified four main factors that contribute to teacher loss: salaries, working conditions, preparation and mentoring support. To retain teachers in agricultural education these problems and concerns need to be adequately addressed through preservice or in-service educational opportunities (Boone & Boone, 2007). A greater understanding of concerns throughout a students educational program might allow educators to help students develop a greater understanding of successful teaching strategies, course sequencing and personal efficacy that may be the key to determining the success of failure of these teachers in the field (Stripling, C., Ricketts, J.C., Roberts, T.G., & Harlin, J.F., 2008).

Theoretical Framework

Fuller, Parsons and Watkins (1974) suggested that while teachers will continuously express concerns regarding education, these concerns change over time. Initially, teachers express a high level of self-concerns regarding their own ability to be successful in the classroom. These concerns must be addressed before teachers can begin to think about the larger scope of teaching. Earlier research by Fuller and Case (1972) developed seven specific categories of concerns using the Teacher Concerns Statement instrument. These categories were condensed into three main categories: self, task, and impact (Fuller, et al. 1974) [Table 1].

Later research by Fuller and Brown (1975) described beginning teachers as being concerned primarily on the self, in other words, believing themselves to be capable of teaching students and becoming a part of the educational environment. As self concerns are resolved, the teacher moves into task concerns or fears about developing appropriate instructional materials, and working with students. Teachers only become concerned about the last category, impact concerns, when self and task concerns have been resolved. Impact concerns regard larger educational decisions and policy and how trends and issues impact students in the classroom. The developmental patterns of this research suggest that teachers should move outward from self concerns to concerns about the task and situation to concerns about students (Conway & Clark, 2000).

Table 1

Description of Concern Levels

Category	Concern level	Explanation of concern level
Not concerned about teaching	0. Non-teaching Concerns	Concerns which are unrelated to teaching.
Self concerns	1. Where do I stand?	Concerns with orientating oneself to a teaching situation, supervisors, teachers, principle, parents, policy, etc.
	2. How Adequate am I?	Concerns about ones adequacy as a person and as a teacher such as discipline and subject matter adequacy.
Task concerns	3. How do pupils feel about me?	Concerns about personal, social and emotional relationships with pupils.
	4. Are Pupils Learning About Teaching?	Concerns about whether pupils are learning material selected by the teacher and concerns about teacher methods.
Impact concerns	5. Are pupils learning what they need?	Concerns about pupils learning what they need as a person and how to influence that kind of learning
	6. How can I improve myself as a teacher?	Concern with the development of pupils in the class and students in general, concerns with personal and professional development and concerns with educational trends, issues and resources and other events in or outside the classroom which influence personal gain.

Note. Table based on research conducted by Fuller, Parsons and Watkins (1974).

Purpose and Objectives

The purpose of this study was to identify a current baseline concern level for three distinct groups involved in the agricultural education program at North Carolina State University: introductory level students enrolled in the "Introduction to Teaching Agriculture" course, advanced students in the "Methods of Teaching Agriculture" course and teachers who have completed their first year teaching in North Carolina and were just beginning their second year. Specifically, this study had three main objectives:

1. To identify the types of concerns and the average concerns score of introductory level students and advanced students in the agricultural education program at North Carolina State University as well as first year agricultural education teachers in North Carolina.

2. To determine if the types of concerns or the average concerns score changes across groups.

3. To identify if gender may be an influential factor over the development of teacher concerns.

Methods and Procedures

Data Collection

This descriptive research study used a survey instrument to gather data. The research population consisted of students enrolled at North Carolina State University in the sophomore level "Introduction to Teaching Agriculture" course (N = 40), students in the "Methods of Teaching Agriculture" course (N = 15) and the teachers in North Carolina who had just completed their first year teaching (N = 22) during the 2008-2009 school year and were beginning their second year. The population frame for first year teachers was established through the state Agricultural Education Directory and through contact with the North Carolina Agricultural Education Coordinator.

Students were given the survey instrument in class with response rates of 89% for the "Introduction to Teaching Agriculture" course and 100% for the "Methods of Teaching Agriculture" course. First year teachers were offered the survey instrument online using SurveyMonkey®. An initial e-mail was sent to teachers informing them of the research study. The e-mail containing the survey link was sent one week later. Subsequent reminder e-mails were sent to non-respondents and a follow-up paper copy of the survey instrument was provided for teachers who had not responded after the third reminder e-mail. The total response rate for first year teachers was 68% (N = 15). A comparison of early and late responders yielded no significant difference in responses (Miller & Smith, 1983).

Instrumentation

The data instrument contained three main parts. The first part of the instrument collected basic demographic data including gender, anticipated teaching level, classification, involvement in agricultural education as a student and age for the student groups. Gender, level currently teaching, certification, level of education, and involvement in agricultural education program during high school was collected for the teacher group.

The second part of the instrument was based on the "Teacher Concerns Statement" instrument designed by Fuller and Case (1972) the instrument consisted of one open-ended question, "When you think about teaching, what are you concerned about? (Do not say what you think others are concerned about but only what concerns you now) Please be frank". This instruments content validity was established by Fuller, et al. through interviews and sessions with teachers. Reliability was established at a .98 correlation coefficient by coding and recoding the concerns data at three week intervals. To ensure correct coding of the material, Fuller and Case (1972) developed a manual for coding the Teacher Concerns Statement. This manual was consulted regularly when coding the instruments. Each statement was ranked on a scale of zero to six based on the concern level. The concerns listed by each participant then added together

divided by the total number of concerns identified. This gave each participant an average concerns score.

The third part of the instrument was a Likert-type scale of 20 items identified through agricultural education research as being problems or areas of concern for agriculture teachers (organizing an effective alumni chapter, organizing an effective advisory committee, organizing FFA activities, managing student discipline in the classroom, recruiting and retaining alumni members, balancing personal and professional responsibilities, recruiting and retaining students, building support of faculty, counselors and administrators, time management, managing finances of the agricultural program, making special education/ESL accommodations, class preparation, developing and managing effective SAE programs for students, motivating students, completing paperwork, developing community support, self confidence, reputation of the previous teacher, multi-teacher issues, and managing and developing program facilities). For each item, participants were asked to rank their level of concern on a scale of one to five with one being "not concerned" and five being "extremely concerned". Part three was validated by a panel of teachers and teacher educators in agricultural education and had a final chronbach's reliability coefficient of .89.

Data analysis

Data was analyzed using the Statistical Package for the Social Sciences SPSS v. 17.0 (2008) Descriptive characteristics were used to describe the demographics of the groups, overall concerns and the frequency of concerns identified in the study. To determine the level of concerns of the three groups, each statement was scored with reference to the teacher concerns coding manual. The number of concerns, total concerns score and the number of concerns identified in each of the three concerns categories identified by Fuller (self-concern, task concern and impact concern) were recorded and coded. One way Analysis of Variance (ANOVA) was used to identify significant differences in concerns scores between the three groups and independent sample t-tests were calculated for gender to determine if differences existed in concerns score based on gender. An alpha level of .05 was set *a priori.*

Findings/Results

Demographics of respondents

For group one, the students in the "Introduction to Teaching Agriculture" course, 31% were male (N = 11), and 69% were female (n = 24). The majority of respondents (66%) were sophomores in college (n = 23), while 31% were juniors (n = 11) and one student was classified as a senior (3%). Out of the population, 83% (n = 29) planned to teach at the high school level, 11% (n = 4) at the middle school/junior high level and 6% (n = 2) planned to teach at the community college level or higher. Most respondents (89%) were involved in agricultural education in high school. The age range of this group varied from 18 to 23 with most students being either 19 (51.4%) or 20 (25.7%) years of age.

The second group consisted of students in the "Methods of Teaching Agriculture" course and was made up of 60% (n = 9) females and 40% (n = 6) males. Because this course is only available to students during their last year in the education program, 100% of the students were seniors. Most of this group planned to teach at the high school level (93%) while only one respondent planned to teach in a middle school/junior high setting (7%). The majority of the

respondents were involved in agricultural education in high school (87%). Ages of this group were from 20 to 26 with 50% (n = 7) of respondents being 21 and 29 % (n = 4) of respondents being 22 [Table 2].

Of the first year teacher group, 47% (n = 7) were male and 53% (n = 8) were female. Most of the first year teachers surveyed were teaching at the high school level (93%, n = 14) though one respondent was teaching at the middle school/junior high level (7%). Over half of the teachers were certified through traditional certification program (60%, n = 9). For most of the teachers (N = 8), the highest level of education completed was their bachelors degree (53%). Only 40% had completed their master's degree (n = 6) and one was currently enrolled in a masters degree program (7%). The majority (73%) of the first year teacher respondents were involved in agricultural education programs when they were in high school (n = 11) [Table 3].

Table 2

Demographic Characteristics of Student Respondents

Demographic Characteristic	"Introduction to Teaching Agriculture" Students		"Methods of Teaching Agriculture" Students	
	n	%	n	%
Gender				
Male	11	31%	9	60%
Female	24	69%	6	40%
Classification				
Sophomore	23	66%		
Junior	11	31%		
Senior	1	3%	15	100%
Level of desired employment				
junior high/middle school	4	11%	1	7%
high school	29	83%	14	93%
community college or university	2	6%		
Involved in agricultural education in high school				
Yes	31	89%	13	87%
No	4	11%	2	13%
Age of Respondents				
Min	18		20	
Max	23		26	
Average	19		21	

Table 3

Demographic Characteristics of Teacher Respondents

Demographic Characteristic	n	%
Gender		
Male	7	47%
Female	8	53%
Level currently teaching		
junior high/middle school	1	7%
high school	14	93%
Method of Certification	9	60%
Traditional	6	40%
Lateral Entry		
Level of Education		
Bachelors	8	53%
Masters	6	40%
Currently enrolled (Masters)	1	7%
Involved in agricultural education in high school		
Yes	11	73%
No	4	27%

Levels of Concerns

Table 4 presents a summary of concerns data across groups. To obtain the total concerns score each statement was assigned a concern value of zero through six based on the level of concern according to Fuller et al (1974), these values were added together and then divided by the number of concerns. Therefore, a higher average concerns score indicates a higher level of concerns identified overall. In group one, the "Introduction to Teaching Agriculture" group, students identified 108 concerns. Of those concerns, 10% were coded as a non-teaching concern, 87% were self-adequacy concerns, 9% were task concerns and 4% were impact concerns. The average concerns score for group one was 1.89. For group two, the "Methods of Teaching Agriculture" group 46 concerns were identified with no concerns being non-teaching concerns, 60% being self concerns, 26% being task concerns and 14% impact concerns. The average concerns score for group two was 2.45. The "first year teacher" group identified a total of 39 concerns. There were no non-teaching concerns, 48% self concerns, 7% task concerns and 45% impact concerns identified. This groups average concerns score was 3.62.

Table 4

Levels of Concerns Across Groups

	"Introduction to Teaching Agriculture" Students		"Methods of Teaching Agriculture" Students		First Year Teachers	
Level of Concern	Number of Concerns	%	Number of Concerns	%	Number of Concerns	%
Non-Teaching	11	10%	0	0	0	0%
Self	99	87%	30	60%	20	48%
Task	10	9%	13	26%	3	7%
Impact	4	4%	7	14%	19	45%
Total concerns	113		50		42	
Average Concern score	1.89		2.45		3.62	

Note. Concerns scores increase from the lowest level of concern (0) to the highest level of concern (6).

Concerns by type

Part three of the instrument used a Likert-type scale to indicate the level of concern of twenty items as defined by previous research in the agricultural education field [Table 5]. The scale was based on a five point Likert-type scale with one being "not concerned", two being "slightly concerned", three being "somewhat concerned", four being "moderately concerned" and five being "extremely concerned".

Table 5

Summary of Likert-type Concerns Scale

	Introduction to Teaching Agriculture			Methods of Teaching Agriculture			First Year Teachers		
Statement	n	M	SD	n	M	SD	n	M	SD
Managing student discipline	35	4.09	1.29	15	4.40	0.82	15	4.27	1.1
Managing the finances of the program	35	3.89	1.08	15	3.80	0.86	15	3.67	1.18
Recruiting and retaining students	35	3.86	1.22	15	4.07	0.88	15	4.00	1.36
Developing community support	35	3.83	1.01	15	3.27	0.96	15	3.67	1.35
Building support of faculty, counselors and administrators	35	3.80	1.20	15	3.67	0.90	15	4.13	1.25
Organizing FFA activities	35	3.74	1.20	15	3.40	1.24	15	4.07	1.34
Making special education/ESL accommodations	35	3.71	1.13	15	3.20	0.68	15	4.20	0.86
Balancing personal and professional responsibilities	35	3.69	1.32	15	3.73	1.39	15	4.40	0.91
Maintaining and developing facilities	35	3.63	1.11	15	3.53	0.84	15	3.93	1.03

Motivating students	35	3.51	1.38	15	3.73	1.22	15	4.20	1.27
Developing and managing effective SAE programs for students	35	3.51	1.04	15	3.33	1.23	15	3.93	1.22
Time management	35	3.46	1.08	15	4.00	0.92	15	4.00	1.2
Completing paperwork	35	3.26	1.46	15	3.00	1.00	15	3.93	0.96
Class preparation	35	3.26	1.25	15	3.40	1.06	15	3.80	1.2
Organizing an advisory committee	35	3.23	1.09	15	3.13	0.64	15	3.00	1.2
Recruiting and retaining alumni	34	3.18	0.97	15	3.33	0.83	15	3.27	1.34
Self confidence	35	3.14	1.44	15	3.33	1.29	15	2.93	1.34
Reputation of the previous teacher	35	2.97	1.27	15	3.73	3.20	14	2.14	1.56
Organizing an effective alumni chapter	35	2.94	1.09	15	3.07	0.59	15	3.27	1.44

Note. 1 = "not concerned", 2 = "slightly concerned", 3 = "somewhat concerned", 4 = "moderately concerned" and 5 = "extremely concerned".

Concern differences between groups

Analysis of variance (ANOVA) was used to determine if there was a significant difference in the average concerns score among the three groups [Table 6]. Based on Fisher HSD Post Hoc analysis, there was a statistically significant differences between the "First Year Teacher" group (n = 15) and both the "Introduction to Teaching Agriculture" group (n = 35) and the "Methods of Teaching Agriculture" (n = 15) groups at the .05 level [Table 7].

Independent sample t-tests showed no significant differences between males and females and the subjects total concerns score $t(63) = -.61$, $p=.22$.

Table 6

Descriptive of the ANOVA Table for Concerns Score Across Groups

Groups	n	M	SD	SE	Min	Max
Introduction to Teaching Agriculture	35	1.88	.92	.16	.50	4.66
Methods of Teaching Agriculture	15	2.45	.79	.21	1.00	4.00
First Year Teachers	15	3.62	1.61	.43	1.50	6.00
Total	63	2.40	2.40	.16	.50	6.00

Table 7

ANOVA table for Concerns Score Across Groups

	SS	df	MS	F	P
Between	30.12	2	15.06	12.76	.001
Within	70.81	60	1.18		
Total	100.93	62			

Conclusions, Discussion and Implications

Objective 1

Based on this study, concerns were identified across the three groups. The Introduction to Teaching Agriculture students expressed the lowest average level of concerns (1.89), the Methods of Teaching Agriculture course had the second lowest level of concerns (2.45) and the first year teachers had the highest level of concerns (3.62). These results are consistent with Fuller and Brown's (1975) research in that there was a trend toward increased levels of concerns over time within the populations of this study. Developmentally this research mimics the outward moving developmental model suggested by Conway and Clark (2000). This model does not completely explain teacher development; however it does allow teacher educators to assess how student thinking may progress and change over the course of their educational career and how teacher educators can address those changes in our coursework.

Objective 2

The results of this research primarily demonstrate a shift from lower level concerns to higher level of concerns. Both the Teacher Concerns Instrument and the 20 item Likert type scale both showed a shift in concerns from concerns based primarily with teaching methods, to concerns more focused around adequately navigating the demands of a first year teaching position. First year teachers expressed a greater concern over completing paperwork, balancing work and personal responsibilities, building support, motivating students and working with students with special needs/English as a Second Language students than the other groups surveyed. Similar to previous research, classroom management was one of the highest concerns among all three groups (Mundt, 1991; Mundt & Conners, 1999; Talbert, et al, 1994; Veeman, 1984).

While the "First Year Teacher" group had a higher average concerns score, they also expressed a greater number of impact concerns then both of the student groups. These findings are consisted with earlier research conducted using the "Teacher Concerns Statement" instrument and similar instruments (Fuller, 1969; Fuller & Brown, 1975; Fuller & Parsons, 1972; Hillison, 1977; Reeves & Kazelskis, 2001).

Objective 3

Contrary to research conducted by Hillison (1977) this research showed no statistically significant differences between males and females in regards to their total concerns score. In Hillison's research he theorized that the differences among gender may have been linked to female agricultural teachers being relatively new to the profession and that newness may have caused a difference in views between the groups. With the commonality of female agricultural teachers today, it is expected that there would be less differences among gender groups regarding teaching concerns. A more recent study by Fritz and Miller (2003) conducted using a similar concern coding instrument also found no significant in concern difference according to gender.

Recommendations

The idea of teacher development as an outward moving process may allow us think about educational courses in a different way. It may be beneficial to provide students with educational opportunities earlier in their college careers that help to address some of the lower level self and impact concerns. This would allow students to gain confidence in their abilities that could then be followed by methods courses to address a higher level of educational concerns. This format might allow for additional student growth over time.

By identifying the concerns of education students and teachers in the field, we can determine what we should be including in teacher education coursework. While both of the student groups generally identified concerns that were more focused on the self and task concerns, they also identified areas that are common concerns within the educational field such as classroom management, program development and managing program finances. The first year teachers however, were more focused on impact concerns and tasks that are associated with the daily teaching environment such as paperwork, support groups, and managing FFA activities. This may suggest that there is a need for in-service workshops and educational opportunities for beginning teachers that are focused more on the "survival skills" necessary for working in a public school setting rather than the educational information that many of them may have been given through their teacher training programs. While providing teachers with educational techniques and strategies through in-service is needed and important, it is likely that topics such as time management and developing support may increase teacher retention. By adequately preparing teachers and addressing their concerns, we can increase job satisfaction and retention (Boone & Boone, 2007).

This study found that teachers at all levels are openly concerned with discipline and classroom management. These results are similar to previously mentioned studies in agricultural education. Therefore, it seems that this is a concern area that may not be being addressed adequately within educational coursework. It may be beneficial for some programs to provide opportunities through workshops or entire courses that are dedicated to classroom management. Ideally, this would allow students to address specific concerns about how to use classroom management effectively and move past those concerns.

In regards to further research, it is recommended that since this study only looked at a small population, it should be replicated on a larger level to see if other agricultural education students follow similar changes over time in regards to concern levels. Also, it would be beneficial to see what factors cause this shift in concerns over time. Can specific coursework allow us to address these student concerns in a way that will make them better teachers later on, or should this be primarily a focus of in-service programs? Lastly, a long range study should be conducted to see how these concern levels may impact long term teacher development and retention.

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Identifying Concerns of Pre-service and In-service Teachers in Agricultural Education

Cliff Ricketts

This study related to concerns of teaching agricultural education. The groups that were a part of the research study were: (1) Introduction to Teaching Agriculture (lower-division students), (2) Methods of Teaching Agriculture (upper-division students), and (3) First-year Agriculture Education Teachers.

One of the challenges experienced by teacher educators is providing students and teachers with necessary skills that they need to be successful in the classroom. The purpose of this study was to describe teacher's concerns over different stages of teacher development. Concerns that were measured are:

Managing Student Discipline
- Managing Program Finances
- Recruiting and Retaining Students
- Building Faculty, Administration, and Counselor Support
- Organizing FFA Activities
- Managing Special Education Students
- Balancing Personal/Professional Life
- Maintaining and Developing Facilities
- Motivating Students
- Developing and Managing SAE's
- Time Management
- Completing Paperwork
- Organizing an Advisory Committee
- Class Preparation
- Recruiting and Retaining Alumni
- Self-Confidence
- Reputation of the Previous Teacher
- Organizing and Effective Alumni
- Developing Community Support

The study was a descriptive research study which used a survey instrument to gather data. The response rate was 89% for Group I, 100% for Group II, and 68% for Group III. The validity of the second part of the instrument was established by another study through interviews and sessions with teachers. Reliability was at a .98 correlation coefficient by coding and reading the concerns data at three week intervals. Part three was validated by a panel of teachers and teacher educators in agricultural education and had a final chronbach's reliability coefficient of .89.

Data was analyzed using the Statistical Package for the Social Sciences SPSS U.17.0. One way Analysis of Variance (ANOVA) was used to identify significant difference in concerns scores between the three groups and endpoint sample t-tests were calculated for each gender to determine if differences existed in concerns scores based on gender.

Based on this study, Group I students expressed the lowest level of concerns, Group II students had the second lowest level of concerns, and Group III teachers exhibited the highest level of concerns. This was a surprise to this reviewer. My observation would have been the

opposite, new students in their first year would have found that they had many false fears. Therefore, it may be beneficial to provide students with earlier educational opportunities in the classroom to gain confidence and followed by methods courses. The researchers are to be commended for their work which can add beneficial knowledge to the profession

.The Impact of Organizational Source Credibility and the Factors that Contribute to Opinion Leaders' Decisions to Diffuse Information

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This study examined source credibility of Florida's agricultural organizations as viewed by state agricultural opinion leaders. In addition, this study sought to determine the amount of information that opinion leaders receive from agriculture organizations as well as identify factors that contribute to an opinion leader disseminating an organization's message. The theoretical framework in this study included the theory of source credibility and the two-step flow model of communication. The research design was a census study of intangibles. The population consisted of the alumni of a leadership program targeted towards adult agricultural leaders. (N=163). Ninety-four alumni responded giving the survey a 57.7% response rate. This study found that opinion leaders receive and find the most credible the information that comes from the organization in which they are most involved. Also it was found that the factor that was most likely to cause an opinion leader to pass down an organizational message was "the organization presents evidence to support its message." Opinion leaders were least likely to pass down information from organizations when "the organization's intent is questionable."

Introduction

In the south, the agricultural industry is a vital part of the economy. In Florida, the agricultural industry ranks second in the overall state economy (Woods, 2008). In this state, there are 280 commodities produced (Florida's Department of Agriculture and Consumer Services, 2007) that were credited with $137 billion in sales revenue for the state in 2007 (Woods, 2008). Not only does the agricultural industry produce important revenue for Florida, but the industry also provides jobs that are essential for the stability of the state's economy. Woods (2008) stated, "Agriculture, natural resources, and related industries provide direct employment of 1.5 million people in full-time and part-time jobs" (¶ 15). This significant number of jobs equates to approximately 14.2 percent of all jobs in Florida as being dependent upon the agriculture industry (Woods, 2008).

With the agriculture industry supporting 1.5 million jobs (Woods, 2008), it is vital that the individuals who depend on the agriculture industry to support their livelihoods receive credible information from industry leaders and organizations. Receiving credible information about the important issues in agriculture ensures that these individuals are able to make informed decisions regarding their livelihoods. However, because of the sizeable number of commodities produced in Florida, there are a myriad of information sources available to agricultural leaders seeking to be informed on important agricultural issues. Yet, not all of the information sources are congruent with the information that they provide about specific issues, leaving those individuals within the agricultural industry to decide which information is credible and can be trusted.

A specific example of this message incongruence was seen in 2008 when Parker and Farmer (2008) claimed in an article within *Farm & Ranch News*, an online publication targeted towards individuals involved in Florida's agriculture industry, that the University of Florida's president stated, "Agriculture is a dying industry in the state" and "not worthy of the investments being made by the legislature" (¶ 2). The alleged statement was made in reference to the impending budget cuts that were to be made by the university. Although the university president fervently denied this accusation in a personal statement, agricultural leaders and their constituents continued to vehemently remind the president that agriculture was indeed, not dying.

Bouffard (2008) quoted the executive director of an influential agricultural organization as stating, "[The university president is] getting a full-frontal attack from agriculture saying we are important," and that "the word's getting very strongly back to the land grant institution that agriculture is very important to this state - it's the backbone" (¶ 4). In addition, Bouffard (2008) also reported, more than 60 agricultural leaders from throughout the state participated in a conference call to address the university president's alleged comments.

While this is only one example, it sets the stage for understanding the importance of identifying sources of information agricultural industry leaders find the most credible and from which sources they base their decision making. One must question why industry leaders appear to trust and give credence to an anonymous source in an online publication more than the fervent personal denial by a university president. What qualities existed within the online publication that caused such believability in the article? Likewise, what qualities caused his denial to go slightly unnoticed and largely distrusted? The answer to these questions and others similar in nature might be found by understanding how agricultural opinion leaders perceive information from industry organizations and discovering which organizational sources are regarded as credible enough for opinion leaders to diffuse the organization's information.

Moreover, as technology advances and organizations become equipped to disseminate messages at a faster and more frequent rate, it will be important to understand the qualities within the organization, the message, and the message receiver that contribute to enhancing the organization's credibility. Finally, this study contributes to the following research priority areas within the Agriculture Education and Communication National Research Agenda 2007-2010:

RPA 1: Enhance decision making within agricultural sectors of society.

- Discovering information that various stakeholders need in order to make informed decisions.

RPA 3: Build competitive societal knowledge and intellectual capabilities

- Understanding how information and media delivery affect thinking processes, problem solving, and decision making related to agriculture

Theoretical Framework

This study focused on the perceived credibility of selected Florida agricultural organizations as viewed by state opinion leaders. Based on the literature, the foundational theoretical principles in this study were narrowed down to include source credibility theory and

the two-step flow model of communication.

Historically, opinion leaders have been recognized as an important link in the diffusion of messages to the general public. Lazarsfeld, Berelson, and Gaudet (1948) conceptualized the diffusion of messages in a two-step flow model of communication. This model first highlighted opinion leaders as an important step in the diffusion of communication messages. The two-step leaders who then pass the information along to individuals within the public (Weiman, 1982). Other studies have elaborated the original two-step flow model to include other steps in the dissemination of information, but the importance of opinion leaders and interpersonal influence continue to remain an important part in linking mass communication to the public.

Researchers have also analyzed the credibility, trustworthiness, and overall attitude towards communicators (Hovland & Weiss, 1954; Kelman & Eagly, 1965; Sternthal, Phillips, & Dholakia, 1978). These studies have been conclusive in reporting that credibility, trustworthiness, and overall attitude towards communicators play an important role in determining how the messages are perceived and accepted by the public.

An initial review of the literature indicated there is a gap in research, which includes studies analyzing agricultural organizations as sources of information and how opinion leaders utilize these organizations to gain information. Currently, very little research has been done on organizational and corporate firms as sources of information (Newell & Goldsmith, 2001). Newell and Goldsmith (2001) defined corporate credibility, in part, as "the extent to which consumers feel that the firm has the knowledge…to fulfill its claims and whether the firm can be trusted to tell the truth or not" (p. 235).

This study examined opinion leaders' perceptions of organizational credibility because as Flynn, Goldsmith, and Eastman (1996) explained, "consumers tend to trust the opinions of others more than they do formal marketer-dominated sources of information, such as advertising, and they use interpersonal sources to reduce risk and to make both store and brand choices" (p. 137). Moreover, Scheufele and Shah (2000) found "opinion leaders, like individuals with personality strength, are thought to shape their fellow citizens' reactions to social issues" (p. 109). Personality strength is described as "a feature of individuals, a reflection of their confidence in leadership roles, their aptitude at shaping others' opinions, and their self-perceived impact on social and political outcomes" (p. 109). Therefore, this study measured 10 personality factors intended to measure the level of introversion and extroversion of agricultural opinion leaders.

Therefore, one could deduce that opinion leaders' acceptance of an agricultural organization as credible has a major impact on the acceptance of the organization as credible by the general public. Relating this statement to the agriculture industry, one could hypothesize that the amount of credibility given to an organization by agricultural opinion leaders directly affects the credibility that others involved in the industry give that same organization.

Purpose

The purpose of this study was to examine the perceived source credibility of Florida's agricultural organizations as viewed by the state's agricultural opinion leaders. In addition, this

study sought to determine the amount of information that opinion leaders receive from agriculture organizations as well as identify factors that contribute to an opinion leader disseminating an organization's message.

Objectives

The following research objectives were used to guide this investigation:

Objective 1: To determine the amount of information that agriculture opinion leaders receive from selected state-wide agriculture organizations.

Objective 2: To determine the perceptions of source credibility of selected organizations in agriculture utilized by state opinion leaders.

Objective 3: To determine the factors that influence whether an opinion leader will disseminate an organizational message to the general public.

Methods

The research design was a quantitative study that utilized descriptive census survey methodology. More specifically, since this study examined the opinions and perceptions of credibility, it can be classified as a census survey of intangibles. The term "intangible" refers to constructs such as attitudes, values, opinions and other personal characteristics that are often difficult to measure (Ary, Jacobs, Razavieh, & Sorensen, 2006). In this study, the population of interest consisted of the state's agriculture opinion leaders.

The sampling frame used in this study included alumni members of an agriculture leadership program targeted towards adult agricultural leaders (N=163). This sampling frame was selected for study because as alumni of the leadership program, they are recognized as leaders in the state's agriculture industry. Additionally, these individuals represent a cross-section of the commodity industries within the state giving the study a broader perspective.

Prior to the collection of data from the alumni members, a pilot test was conducted. The pilot study included 29 current participants in the leadership program. Upon receiving the data of the pilot study, the researcher conducted a Cronbach's alpha test and determined the reliability of the credibility construct to be a coefficient of 0.94. According to the literature, an alpha coefficient of 0.70 has shown to be an acceptable reliability coefficient (Nunnaly, 1978, as cited by Santos, 1999). Once the pilot data were collected, the panel of experts reviewed the data. Following the review by the panel of experts and in conjunction with participant feedback, the researcher modified the instrument to more accurately assess the population. The instrument was expanded to include specific questions relating to factors that impact message dissemination, as well as a series of personality questions. Following the revision, a second pilot test was conducted.

The second pilot test was sent electronically to 10 current participants in the leadership program. The response rate for this second pilot test was 80%. In order to test the reliability of

the newly added survey instrument questions, a Cronbach's alpha test was conducted. The results from this test showed that the reliability of the section measuring factors that impact message dissemination was an alpha coefficient of 0.98. Moreover, Cronbach's alpha measured reliability of the personality section at a coefficient of 0.86.

In order to gather data from the sampling frame, a Web survey was utilized. Dillman (2006) suggested that Web surveys offered a great deal of potential for very little cost. Moreover, Dillman's Tailored Design Method suggests distributing the survey through a system of five contacts (Dillman, 2007). This five contact method was used in reaching the sampling frame. Specifically, the contacts made included: a brief pre-notice letter, a questionnaire, a thank-you postcard, a replacement questionnaire, and a final contact (Dillman, 2007).

The researcher found no existing instrument that measured the source credibility of agricultural organizations; therefore, the researcher created the instrument. After consulting with a panel of experts, the following organizations were selected to be a part of this study: Florida Department of Agriculture and Consumer Services, Florida Farm Bureau Federation, The University of Florida/IFAS, all state-wide agricultural organizations as a whole, and one specific organization selected by the study respondent.

The first part of the questionnaire required the respondents to answer questions regarding how much of their information they receive from the state department of agriculture and consumer services, state farm bureau federation, land grant university, and all other statewide agricultural organizations, as well as the organization in which they are most involved. The questionnaire then allowed for the respondents to write in the organization in which they are most involved.

Then the respondents assessed regarding their perceived credibility of organizations by responding to 11 unique constructs that measured the trustworthiness and the expertise of each organization. Once each organization's perceived credibility was measured, a credibility index was created in order to rank the credibility of the organizations used in the study. The third part of the questionnaire questioned respondents regarding 26 factors that could potentially affect whether a message from an organization would be distributed via opinion leaders. Finally, questions were asked regarding personality factors about each opinion leader. Following the questionnaire, demographic data were collected from the respondents.

Results

Of the 163 participants in the sampling frame, 94 responded giving the study a 57.7% response rate. This was an acceptable response rate as it was higher than a previously published study (Strickland, 2008) that utilized the same sampling frame. In Strickland's (2008) study utilizing the same sampling frame, a 42.1% response rate was gained. The non-response error was accounted for by comparing the early to the late responders. Ary et al. (2006) asserted that non-respondents are often similar to late respondents; meaning that by examining the responses of non-responders, the researcher should be able to estimate the responses of late respondents.

The leadership program alumni were analyzed by the following demographics: age, gender, education level, leadership position held, length of leadership position, and race. Of the

respondents, 64.9% (*n*=61) were male, 21.3% (*n*=20) were female, and 13.8% (*n*=13) did not respond. In the age category 7.4% (*n*=7) reported being 25-35 years old; 26.6% (*n*= 25) reported being 36-45 years old; 40.4% (*n*= 38) reported being 46-55 years old; and, 12.8% (*n*= 12) reported being 55 years old or older.

In regard to the respondents' educational background, 3.2% (*n*=3) described their highest level of education to be high school graduate or GED recipient; 8.5% (*n*=8) had some college but did not receive a degree; 1.1% (*n*=1) indicated their highest level of education was an associate's degree; 53.2% (*n*= 50) received a bachelor's degree; and, 21.3% (*n*=20) received a graduate level or professional degree.

Additionally, 76.6% (*n*=71) of the respondents reported to have held a leadership position in the agriculture industry. Of the 71 respondents who reported having held a leadership position, 14.1% (*n*=10) served in that position for 1-2 years; 8.5% (*n*=6) served in a leadership position for 2-3 years; 11.3% (*n*=8) served in a leadership position for 3-4 years; 9.9% (*n*=7) served in a leadership position for 4-5 years: and, 56.3% (*n*=40) served in a leadership position for 5-6 years.

Objective one sought to determine the amount of information that opinion leaders receive from each organization in the study. This objective had a range possibility of one to five with one equaling "none at all" and five equaling "a great deal." Of the five organizational categories, the organization in which the respondent was most involved had the highest mean score (*M*= 4.18, *SD*=0.977) and the state department of agriculture and consumer services received the lowest score (*M*=2.62, *SD*= 0.986).

Table 1-1. Opinion Leaders Information Reception from Agricultural Organizations Mean Scores

	M	*SD*	Min	Max
Organization Most Involved	4.18	0.977	1	5
The University of Florida/IFAS	3.67	0.968	1	5
Other State Organizations	3.22	1.212	1	5
Florida Farm Bureau Federation	3.01	1.282	1	5
Florida Department of Agriculture	2.62	0.986	1	5

Objective two sought to determine the perceptions of source credibility of selected organizations in the state's agriculture industry that are utilized by opinion leaders. Following the gathering of information regarding how much information leaders receive from each of the organizations in the study, opinion leaders measured each organization in credibility constructs. These constructs included sincerity, honesty, trustworthiness, dependability, reliability, knowledge, experience, qualifications, skills, expertness, balance. Once the 11 individual constructs were measured for each organization, a credibility index was created for each of the organizations in order to secure a credibility mean for each organization (Table 1-2). The credibility index was created by calculating the combined mean scores for the 11 credibility constructs. The organization that received the highest credibility index score was the organization that the respondent was most involved (*M*=4.27, *SD*=0.732). The organization receiving the lowest credibility index score was the collective all other state organizations not listed in the survey (*M*=3.50, *SD*=0.852).

Table 1-2. Credibility Index of Agricultural Organizations

	M	*SD*	Min	Max
Organization Most Involved	4.27	0.732	1.55	5
The University of Florida/IFAS	4.12	0.657	2.09	5
Florida Farm Bureau Federation	3.94	0.815	2.00	5
Florida Department of Agriculture	3.68	0.802	1.36	5
Other State Organizations	3.50	0.852	2.00	5

Objective three measured 26 factors believed to influence whether messages from agricultural organizations were disseminated from opinion leaders down to the general public. These factors were based on input from the pilot test groups, the panel of experts and the literature. The range scale scores were 1-5 with labels indicating that 1=disagree, 3=somewhat agree, and 5=agree. The factor that received the highest mean score indicating a strong tendency to pass along the information was "The organization presents evidence to support its message" (*M*=4.55, *SD*=0.610*).* The factor that received the lowest mean score indicating a weaker tendency to pass along the information was "The organization's intent is questionable" (*M*=2.01*, SD*=1.174). Table 1-3 exhibits the factors, frequencies, means, and standard deviations of the 26 factors used in the study.

Table 1-3. Factors that Influenced Information Dissemination by Opinion Leaders (n=94)

Information Dissemination Factor	*M*	*SD*
The organization presents evidence to support its message.	4.55	0.61
I understand the organization's stance on the issue.	4.53	0.63
The issue affects my livelihood.	4.49	0.78
The issue has large financial implications.	4.34	0.77
I feel a sense of responsibility to others to pass along the information.	4.29	0.77
The organization has a logical association with the issue.	4.28	0.79
The organization is familiar to me.	4.27	0.82
The organization appears to be well-managed.	4.17	0.85
I have personal time to relay the information.	4.14	0.93
I personally know others within the organization.	4.11	0.96
The issue affects a large number of people	4.07	0.87
Based on my past interactions with the organization, I have positive feelings toward the organization.	4.05	1.04
I am a member of the organization.	3.98	1.09
The organization has a vested interest in the issue.	3.90	0.89
I perceive personal benefits based on the organization's information.	3.82	1.10
I agree with the organization's stance on the issue.	3.78	1.29
The issue evokes a personal emotional response.	3.41	1.18
I perceive personal detrimental consequences based on the organization's information.	3.30	1.44
I perceive detrimental consequences for others based on the organization's information.	3.30	1.35
The issue is controversial in nature.	3.12	0.98
The organization's information is new to me.	3.08	1.07
The organization's information conflicts with previous information that I've heard.	2.83	1.16
The issue is against my personal values/beliefs.	2.55	1.42
The organization appears to be motivated by profit.	2.22	1.04
Based on my past interactions with the organization, I have negative feelings toward the organization.	2.22	1.12
The organization's intent is questionable.	2.01	1.17

This study measured 10 personality factors intended to measure the level of introversion and extroversion of agricultural opinion leaders. These factors were based on input from the panel of experts and the literature. The survey respondents were presented with a statement in which they selected "agree" or "disagree." Labels were given to the terms "agree" and "disagree" in order to transform them into numerical figures for the purpose of calculating means. The number 1 was assigned to the term "agree" and the number 2 was assigned to the term "disagree."

Table 1-4. Frequencies and Percentages of Extroversion Factors of Agriculture Opinion Leaders

	Agree	Disagree	*M*	*SD*
I like to be the center of attention.	19 (20.2%)	**65 (69.1%)**	1.77	0.421
I like to be the life of the party.	21 (22.3%)	**63 (67.0%)**	1.75	.0436
I like to be where the action is occurring.	**61 (64.9%)**	19 (20.2%)	1.24	0.428
I make new friends easily.	**71 (75.5%)**	12 (12.8%)	1.14	0.354
I am skilled in handling social situations.	**81 (86.2%)**	3 (3.2%)	1.04	0.187

Note. Bolded coefficients represent the highest frequencies and percentages within each factor.

Table 1-5. Frequencies and Percentages of Introversion Factors of Agriculture Opinion Leaders

	Agree	Disagree	*M*	*SD*
I don't like to go out on the weekends.	24 (25.5%)	**58 (61.7%)**	1.77	0.738
I am quiet around strangers.	32 (34%)	**51 (54.3%)**	1.61	0.490
I don't like to draw attention to myself.	**52 (55.3%)**	32 (34.0%)	1.38	0.489
I often enjoy spending time alone.	**63 (67.0%)**	20 (21.3%)	1.24	0.430
I like to work independently.	**64 (68.1%)**	19 (20.2%)	1.23	0.423

Note. Bolded coefficients represent the highest frequencies and percentages within each factor.

Once the frequencies and percentages of the factors that that influence message dissemination were determined, a Pearson Product Moment Correlation coefficients were computed to reveal if any correlations existed between the message factors and personality factors. The magnitudes of the correlations are presented and discussed using the correlation magnitudes suggested by Miller (1994). Pearson r was used for all of the analyses. Correlation coefficients between 0.01 and 0.09 are considered negligible, correlations between 0.10 and 0.29 are considered low, correlations between 0.30 and 0.49 are considered moderate, correlations between 0.50 and 0.69 are considered substantial, correlations between 0.70 and 0.99 are considered very high, and a correlation coefficient of 1.00 is considered perfect (Miller, 1994).

The first correlations present existed between the message factor "I agree with the organization's stance on the issue" and the personality factor "I don't like to draw attention to myself"
(r=-0.23). A second correlation existed between this message factor and "I enjoy being the center of attention" (r= 0.22).

Table 4-46. Pearson Correlation Between Personality Factors and Message Factors

Variable	I agree with the organization's stance on the issue
I don't like to draw attention to myself	-0.23
I enjoy being the center of attention	0.22

*Note: all significant at p<.05

The second correlations found revolved around the message factor of "based on my past interactions with the organization, I have negative feelings toward the organization." The personality factors that correlated with this statement included: "I like to work independently" (r= -0.22) and "I don't like to go out on the weekends" (r= -0.26).

Table 4-47. Pearson Correlation Between Message Factors and Personality Factors

Variable	Based on my past interactions with the organization, I have negative feelings toward the organization
I like to work independently	-0.22
I don't like to go out on the weekends	-0.26

*Note: all significant at p<.05

The third set of correlations between message factors and personality factors includes "I feel a sense of responsibility to others to pass along the information" and "I make new friends easily" (r= -0.24).

Table 4-48. Pearson Correlation Between Personality Factors and Message Factors

Variable	I feel a sense of responsibility to others to pass

	along the information
I make new friends easily	-0.24

*Note: all significant at p<.05

The fourth set of correlations between message factors and personality factors revolves around the message factor of "the issue is controversial in nature" and "I like to be where the action is occurring" (r= 0.30).

Table 4-49. Pearson Correlation Between Personality Factors and Message Factors

Variable	The issue is controversial in nature
I like to be where the action is occurring	0.30

The fifth set of correlations between message factors and personality factors involves the message variable "I am a member of the organization" and "I don't like to draw attention to myself" (r=-0.23).

Table 4-50. Pearson Correlation Between Personality Factors and Message Factors

Variable	I am a member of the organization
I don't like to draw attention to myself	-0.23

*Note: all significant at p<.05

The sixth set of correlations that exists between includes the message factor "the issue affects a large number of people" and "I am quiet around strangers" (r=-0.27).

Table 4-51. Pearson Correlation Between Personality Factors and Message Factors

Variable	The issue affects a large number of people.
I am quiet around strangers	-0.27

*Note: all significant at p<.05

Conclusions

Opinion leaders receive the majority of their information from organizations in which they are most involved.

Opinion leaders trust the information the most that originates from the organization in which they are most involved.

- Opinion leaders consistently rated all of the organizations used in this study as lacking in the credibility construct of balanced.

Opinion leaders will be most likely to pass along information when they understand the organization's stance on the issue.

Individuals with stronger extroversion personalities will be more likely to pass along information from organizations.

Opinion leaders who like to be where the action is occurring are more likely to pass along a message that is controversial in nature.

Discussion/Implications

This study found that opinion leaders receive the majority of their information from the organization in which they are involved the most. Following the organization in which they are most involved, this Florida opinion leaders will seek information from an educational entity such as the University of Florida/IFAS. In this study, it was found that only after opinion leaders received information from their organization of involvement and the land grant institution, did they get information from other state agricultural organizations in which they were not a member. Therefore, in order to successfully distribute a message, it would appear that an organization will have the most success by creating "buy-in" for their own membership before trying to expand the message to reach others in the industry.

This study's credibility index indicated that not only did the study participants receive the majority of their information from the organization that they were most involved, but they also found the organization in which that they were most involved more credible than any other organization listed in the study. Following the organization in which they were most involved, respondents listed the state's land grant university as being the second most credible organization in the study. When analyzing the individual credibility constructs, it can be seen that the construct rated the highest in regard to the organization the respondent was most involved was trustworthiness, while the respondents rated the land grant university's highest construct as being knowledgeable. This finding can be linked back to Lui and Standing's (1989) finding that when sources are compared based on trustworthiness and expertise, individuals will find the source they deem as trustworthy more credible than one they deem as being an expert. The same finding was true in this study. Respondents found the organization they trusted the most as being more credible than the expert source.

Moreover, Sternthal, Phillips, and Dholakia (1978) asserted that the organization deemed as highly credible is able to extract greater advocacy support; therefore, the organizations that opinion leaders are most involved in should be the some of the largest advocacy groups in the state. The organization that respondents listed as being most involved in was a state association whose Web site claims to be "leading voice of [state's] agriculture."

After analyzing all of the organizational credibility constructs, the construct balanced was consistently rated as lowest for all five organizations. However, the construct honest was rated as one of the two highest means for all organizations except the land grant university. Therefore, opinion leaders appear to believe that even if organizations lack balance in their information, the organization can still be regarded as relatively honest. This perception of lack of balanced information could be attributed to Rogers (2003) who noted that opinion leaders tend to be more exposed to external media and communication efforts; as well as, Ruth's (2005) study that revealed the agriculture "industry tends to talks to itself, meaning communicating to agricultural media and

audiences and ignoring the consumer media and non-agricultural publics" (p. 111). It appears that because opinion leaders are more aware of the presence of external media and realize that the industry tends to talk to itself, they feel the information from industry organizations is unbalanced.

In regards to the 26 factors that determine if an opinion leader will diffuse a message from an organization, one factor was found have a positive impact. This factor was that the opinion leader had positive feelings toward the organization based on past interactions. An individual's feelings and attitudes shape their overall perception of the organization. Kelman and Eagly (1965) revealed that when individuals felt negatively about an information source, they were more likely to misinterpret the source's message. In fact, Kelman and Eagly found that when there are positive feelings toward the information source, the individuals tend to align their own beliefs more with the source of information.

Another factor that was used in the study that supported past literature was if the opinion leaders personally knew others in the organization. In this study, knowing others in the organization indicated a strong tendency to pass along the information from the organization. Rogers (2003) reported opinion leaders as being "at the center of interpersonal communication networks" (p. 27). Similarly, Beckman (1967) noted that an "aspect that has been… reinforced…
is that interpersonal relationships between opinion leaders and others… influenced decisions"
(p. 37).

In terms of personality factors affecting messages from organizations being disseminated, it can be derived that opinion leaders with strong extroversion personalities will be more likely to pass along information from organizations. One correlation worth mentioning in the discussion section is the moderate correlation found between "I like to be where the action is occurring" and "the issue is controversial in nature" (r=0.30). This correlation suggests that opinion leaders who enjoy being where the action is occurring will pass along information to others if the issue happens to be controversial in nature. This finding could be linked back to Burt's (1999) assertion of "people who do better [meaning have more social capital] are better connected" (p. 48). It is a socially understood that typically bad news travels faster than good news; therefore possible that leaders who like action pass along controversial information because the controversial message creates more "action" and because people typically want to hear controversial information making the opinion leader better connected to those around them.

A second correlation worth mentioning in this discussion section includes a low correlation discovered between "I am quiet around strangers" and "the issue affects a large number of people" (r=-0.27). This correlation suggests those opinion leaders who are typically quiet around strangers will in fact diffuse an organization's message if the issue affects a large number of people. This finding can be tied back to Rogers (2003) who stated opinion leaders often have a very "unique and influential position in their system's communication structure: they are at the center of interpersonal communication

networks" (p. 27). Being at the center of an interpersonal communication network likely causes a feeling of responsibility to share information to the network, especially is the opinion leader feels the message could affect a large portion of their network.

Recommendations

Since the constructs of organizational credibility used in this study were limited to the panel of experts, literature and a pilot study, a qualitative study should be done with opinion leaders to uncover any additional factors that could add to the overall perceptions of organizational credibility and were not used in this study.

Research should be done that further investigates how personality type influences organizational credibility assessment. Research should assess the best method for increasing organizational credibility among introverts and extroverts. For example- extroverts may find the organization credible simply as a means to draw attention to themselves; while, introverts may find the organization more credible if they have had a "say" in crafting the message.

Research should be done to determine if different types of organizations have different credibility expectations. For example, do opinion leaders value some credibility constructs more important than others depending upon the organization disseminating the message (universities v. government agencies)?

Research should be done that explores whether the communication channel (i.e Internet, print, face-to-face) affects the organization's credibility.

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The Impact of Organizational Source Credibility and the Factors that Contribute to Opinion Leaders' Decisions to Diffuse Information

Discussant: Dr. Jennifer Williams, Texas A&M University

Very interesting study looking almost at media consumption and dissemination from opinion leaders.

Looking at your demographic data, do you believe age of opinion leaders has any influence on your other variables? This may be a second study on generation and information diffusion.
What does this mean for Land Grants? There seems to be many implications for extension and communication professionals in agriculture also.

Unique addition of personality with diffusion.

Leadership and Decision-making Life Skill Development In Mississippi 4-H Shooting Sports Participants

Shanna Holder, Mississippi State University

Jacquelyn Deeds, Mississippi State University

Abstract

The purpose of this descriptive research is to determine how 4-H youth participating in Mississippi 4-H Shooting Sports Program learn leadership and decision-making skills. This survey research project is descriptive in nature. Researchers gathered self leadership and decision-making life skills perceptions of 4-H shooting sports state invitational qualifiers from these 4-H State Shooting Sports competitions.

Youth surveyed indicated a gain in leadership and decision-making life skills through participation in Mississippi 4-H Shooting Sports Program. The mean participant in the program is a Caucasian male 16 years old, has been participating in 4-H Youth Development Organization for 5 years, has been participating for 4 years, and practices 4-6 hours per week.

Introduction

The future lies in the hands of the youth of today. Youth grow up to be doctors, CEOs, professors, and members of congress. These and many other careers require life skills such as leadership and decision making. Youth need to develop leadership and decision-making life skills to successfully fulfill those highly respected positions. In order to lay the ground work for these important skills, adults must facilitate the learning environment for youth to make wise decisions and improve their leadership skills. Life skills can be learned for use in decisions such as wearing a seat belt while in a car and choosing not to abuse drugs and alcohol. By incorporating safety, well-being, health, and educational success into youth's lives, they grow up to become financially and psychologically successful adults (Roth, Brooks-Gunn, Murray, & Foster, 1998).

Of the 857,305 minors in Mississippi below the age 19 in over half are faced with issues that could hamper their success in the future (United States Census Bureau, 2008). These youth are dealing with matters such as poverty, violence, pregnancy, drugs and alcohol. These issues are becoming a significant problem in both rural and urban areas (Vowell and Wells, 1996). These risk behaviors lead to bad decision making that lead to poor mental and physical health and poor economic stability (Annie. E. Casey Foundation, 2008). These factors make it difficult for a young person to become a successful adult.

According to the National 4-H website (2009), one of the largest national youth serving organizations is the 4-H Youth Development Program. It utilizes the life skill

model for its programs and has a youth centered atmosphere. The 4-H program has been an active organization for over 100 years and is a positive youth development organization that caters to children of 5-18 years old. This nationwide youth organization includes all 50 states and territories.

The development of life skills through experiential learning is the cornerstone of 4-H. The number of the nation's youth exhibiting at-risk behavior points to a lack of necessary skills such as working with others, understanding self, communicating, making decisions, and leadership. These are life skills that are required by adults to be successful in everyday living (Boyd, Herring, & Briers, 1992).

When 4-H first began in the early 1900's, the program emphasis was on agricultural production skills. In the more than 100 years since 4-H started, the program has broadened to include general youth development and learning skills necessary to live in today's society (Blackwell, 1990). Two goals of the 4-H program are to help youth learn leadership skills and to assist youth in developing decision-making skills as a part of the broader life-skill development.

This study focuses on the Mississippi 4-H Youth Development Shooting Sports Program (4-H SSP). 4-H SSP is one of the many 4-H programs and project areas offered through the 4-H Youth Development Program. The underlying goal of the 4-H SSP is to develop fundamental life skills. These life skills are integrated in the fun, hands-on experiential learning offered in the 4-H SSP (Howard, 1987).

It has become increasingly necessary for the extension service and 4-H programs to be accountable for financial support and to justify their association with the land grant university system, the United States Department of Agriculture, and county governing bodies (Miller, 1981). This study was the first life skill development evaluation of the 4-H Shooting Sports Program in this state.

Theoretical Background

4-H Youth Development has a rich historical background in educational theories. The program uses "hands-on" educational learning theories such as experiential learning and learn-by-doing. Both theories promote active learning processes where the learner acquires information and life skills through practical application with real-world usage potential. One of the first people to explain experiential learning was Seaman Knapp (Rasmussen, 1989). He instituted result demonstrations where children modeled new crop production techniques or safer canning processes. Their parents saw how much more efficient the techniques proved to be. Experiential Learning Theory was developed by Kolb (1995). Experiential learning theory was defined as "educational programs offered as an integral part of the general school curriculum, but taking place outside the conventional classroom, where students are in new roles featuring significant tasks with real consequences and where the emphasis is on learning by doing with associated reflection" (Weatherford and Weatherford, 1987, pg.2).

There are five steps in the practical application of experiential learning theory model (Diem, 2004). The process can be summed up in three main processes, which are to do, to reflect, and to apply (Figure 1). The 4-H Youth Development Program utilizes the Experiential Model of Learning with all their curricula.

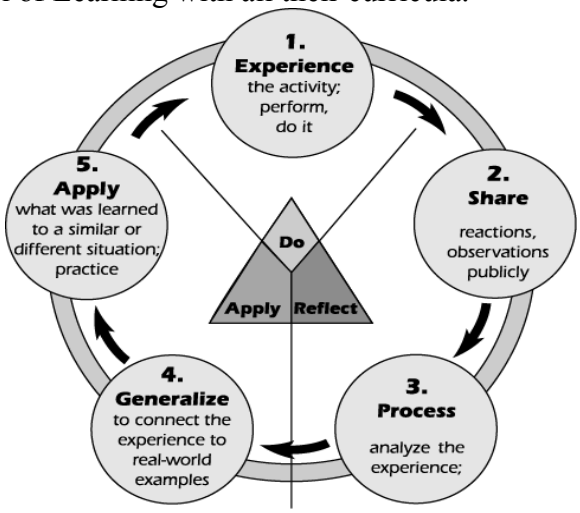

Figure 1 Experiential Learning Model (Pfeiffer and Jones, 1985)

There are several advantages of the Experiential Learning Model. Multiple teaching and learning methods may be used with this learning model. The learner is the center of the instruction. It also builds self-esteem though the discovery process and is a fun experience for both learner and teacher. In the Experiential Life Skills Model, several life skills can be learned through a single lesson. (Diem, 2004; Enfield, 2001).

Through experiential learning and interacting with adult leaders, 4-H clubs emphasize both personal and group leadership development. Adolescence is a time when experiential learning and adult contact is crucial to adolescent development (Wessel & Wessel, 1982). The Experiential Learning Model allows youth to learn several life skills through various experiences (Enfield, 2001). Specifically in the processing step, youth should relate the experience to a targeted life skill (Hendricks, 1998). Development of these life skills though experiential learning is the cornerstone of 4-H Youth Development programming (Boyd, et. al., 1992). Life skills development was built into 4-H projects, activities and events to help youth become contributing, productive, self-directed members of society.

Skills needed by youth are identified in the Targeting Life Skills Model (Figure 2). The Targeting Life Skills Model defines leadership qualities as someone who has a vision, motivation to lead, inspires others to action, communicates effectively, works well with people and groups, involves others in meaningful ways by delegating responsibility and sharing leadership, can plan, organize and assess goals, accepts differences in people and in their opinions, has personal values and traits of good character, generates resources like time, money and other people (Hendricks, 1998).

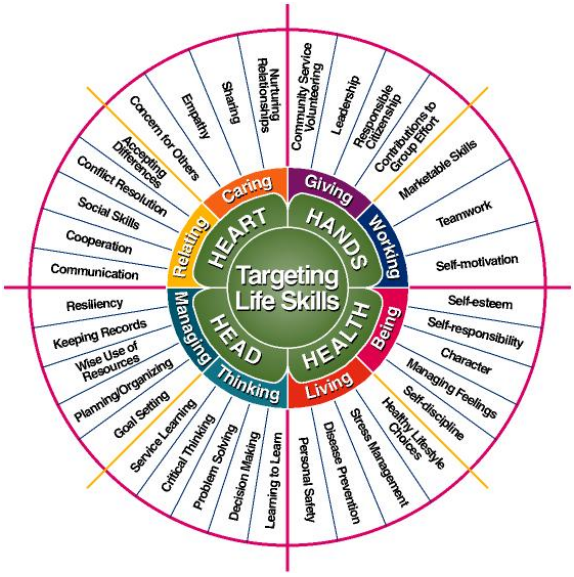

Figure 2 Targeting Life Skills Model (Hendricks, 1998, p. 5)

Decision-making is a complex process people use in their daily lives to answer questions, choose activities to complete, and even choosing a vocation (Adkins, 1995). Hendricks (1998) classified decision-making as part of one of the 4 Hs: Head. Thinking is the ability to form ideas and make decision by choosing among several alternatives. The decision-making process is to specify goals and constraints, generate alternatives, consider risks and appraise alternatives, and choose an alternative to implement (Hendricks, 1998).

Purpose and Research Questions

The purpose of this study was to determine whether youth perceived to gain leadership and utilize decision making skills through their involvement in the Mississippi 4-H Shooting Sports Program. There were three research questions that this survey research answered.

1. What leadership skills do the Mississippi 4-H Shooting Sports State Invitational qualifiers perceive they have gained by their involvement in the 4-H SSP?

2. What decision-making skills do the Mississippi 4-H Shooting Sports State Invitational qualifiers perceive they have gained through their involvement in the 4-H SSP?

3. What proportion of variance in Mississippi 4-H Shooting Sports State Invitational qualifiers leadership and decision making skills can be attributed to each selected characteristic: age, ethnic background, gender, number of years in 4-H, number of years in 4-H shooting sports, and number of hours practiced per week?

Methods and Procedures

The research design of this was project is descriptive in nature. Researchers gathered self leadership and decision making life skills perceptions of Mississippi 4-H Shooting Sports State Invitational qualifiers from the Mississippi 4-H State Shooting Sports Invitational Competitions.

The 4-H SSP had 5,874 youth involved between October 31, 2008 and September 1, 2009. The youth ranged in age from 8 to18 years old. All of these youth involved in the 4-H Shooting Sports were eligible to participate in the county practices, county competitions, and district competitions. The top participants from the district competitions were invited to participate in one of the two 4-H Shooting Sports Invitational, July 17 and 18, 2009 or 4-H Shooting Sports Shotgun Invitational, July 24 and 25, 2009. The population included the state invitational qualifiers that competed in one of the disciplines which included muzzleloader, air pistol, air rifle, .22 pistol, .22 rifle, archery compound bow, or archery recurve bow contests (N = 228). Consent letters were sent to the parents of the population. The letter included information about the research project as well as the parental consent form. An extra copy of the letter and protocol for the research project was included in the mailing. The youth were given an assent form to be signed at the competition. The youth in the population then were allowed to take the survey. There were 19 youth that qualified for the invitational but were unable to attend the competition. The total participants of Mississippi 4-H Shooting Sports Invitations included 209 participants, with 179 surveys returned for an 85.6% return rate.

The dependent variables for the study were the level of leadership life skills development and level of decision making life skills development as determined by the Youth Leadership Life Skills Development Scale (YLLSDS) and Decision-Making Life Skills Development (DMLSD) instrument respectively. The YLLSDS developed by Seevers, Dormody, and Clason (1995) includes 30 indicators, reduced from the original 68 indicators categorized by Miller (1976). The Cronbach's alpha reliability coefficient for the 30-question scale was .98. However, all seven of the original conceptual sub-domains developed by Miller (1976) are represented in the final scale (Slocum, 2004). The conceptual sub-domains in the YLLSDS, and number of indicators for each, include communication skills, decision-making skills, skills in getting along with others, learning skills, management skills, skills in understanding self, and skill in working with groups. Each youth leadership life skills development indicator used a four-point sub-scale ranging from "no gain" to "a lot of gain." Total scale score could range from 0 to 90. The second part of the instrument was the DMLSD. It was developed by University of Tennessee and included 10 indicators. The Cronbach's alpha estimate of reliability was .78 (Donaldson, 2009). Third part of the instrument included the independent variables. They were determined by age, gender, race, years in 4-H, years in 4-H SSP, and number of hours spent practicing per week.

Findings

Question 1- What leadership skills do the Mississippi 4-H Shooting Sports State Invitational qualifiers perceive they have gained by their involvement in the 4-H SSP?

Participants completed the youth YLLSDS as part of the instrument. The Cronbach's alpha reliability coefficient for the 30-question scale was .96, which was similar to the .98 obtained by Seevers and Dormody (1995). The overall mean of youth surveyed was 2.19, with a standard deviation of .57. The participants chose "moderate gain" or "a lot of gain" most frequently as shown in Table 1. The highest frequency for each item indicated higher frequency in both "moderate gain" and "a lot of gain".

Table 1

Youth Leadership Life Skill Development Scale Item Answer Frequency

As a result of my 4-H Shooting Sports experience I:	F	%	F	%	F	%	F	%
1. Can determine needs	10	5.6	30	16.8	88	49.2	51	28.5
2. Have a positive self-concept	12	6.7	23	12.8	86	48.0	58	32.4
3. Can express feelings	17	9.5	31	17.3	64	35.8	67	37.4
4. Can set goals	9	5.0	10	5.6	69	38.5	91	50.8
5. Can be honest with others	12	6.7	21	11.7	59	33.0	87	48.6
6. Can use information to solve problems	9	5.0	26	14.5	77	43.0	67	37.4
7. Can delegate responsibility	6	3.4	26	14.0	79	44.1	69	38.5
8. Can set priorities	7	3.9	30	16.6	63	35.2	79	44.1
9. Am sensitive to others	15	8.4	37	20.7	77	43.0	50	27.9
10. Am open-minded	9	5.0	19	10.6	74	41.3	77	43.0
11. Consider the needs of others	7	3.9	23	12.8	76	42.5	73	40.8
12. Show a responsible attitude	8	4.5	17	9.5	63	35.2	91	50.8
13. Have friendly personality	7	3.9	19	10.6	62	34.6	91	50.8
14. Consider input from all groups members	8	4.5	23	12.8	70	39.1	78	43.6
15. Can listen effectively	7	3.9	22	12.3	72	40.2	78	43.6
16. Can select alternatives	7	3.9	19	10.7	85	47.8	67	37.6
17. Recognize the worth of others	8	4.5	23	12.8	73	40.8	75	41.9
18. Create an atmosphere of acceptance	9	5.0	23	12.8	82	45.8	65	36.3
	8	4.5	24	13.4	80	44.7	67	37.4
	4	2.2	16	8.9	59	33.0	100	55.9
	5	2.8	19	10.6	79	44.1	76	42.5
	10	5.6	13	7.3	86	48.0	70	39.1

19. Can consider	6	3.4	32	17.9	85	47.5	56	31.3
alternatives	7	3.9	28	15.6	84	46.9	60	33.5
20. Respect others	6	3.4	18	10.1	73	40.8	82	45.8
21. Can solve problems	8	4.5	27	15.1	71	39.7	73	40.8
22. Can handle mistakes	4	2.2	35	19.6	73	40.8	67	37.4
23. Can be tactful	10	5.6	25	14.0	79	44.1	65	36.3
24. Can be flexible	7	3.9	15	8.4	58	32.4	99	55.3
25. Get along with others	9	5.0	25	14.0	73	40.8	72	40.2
26. Can clarify my values								
27. Use rational Thinking								
28. Am open to change								
29. Have good manners								
30. Trust other people								

Question 2- What decision making skills do the Mississippi 4-H Shooting Sports State Invitational qualifiers perceive they have gained through their involvement in the 4-H SSP?

The Cronbach's alpha reliability coefficient for the 10-question scale was 0.89 similar to the reliability of 0.78 found by experts at the University of Tennessee (Donaldson, 2009). They created the DMLSD based on the Targeting Life skills by Hendricks and was developed by expert panels as post-only measures. Overall mean of youth surveyed indicated a 2.98 with a standard deviation of 0.71. Therefore, the youth had slightly mean perception of their ability of make decisions. The highest frequency for each item indicated higher frequency in both "often" and "always" used decision-making skills because of 4-H SSP (Table 2).

Table 2

Decision-making Life Skills Development Scale Item Answers Frequency

Based on my 4-H Shooting Sports experience:	F	%	F	%	F	%	F	%	F	%
1. I try to identify what causes a problem	5	2.8	11	6.1	44	24.6	69	38.5	50	27.9
2. I think about the problem before trying to solve it.	5	2.8	11	6.1	32	17.9	73	40.8	58	32.4
3. I get information about the problem.	2	1.1	18	10.1	55	30.7	58	33.4	46	25.7
4. I ask others to help me identify the problem.	9	5.0	19	10.6	50	27.9	62	34.6	39	21.8
5. I listen to people w/ more										

	experience than me.	2	1.1		5.6	20	11.2	52		95	
6.	I think about ways of dealing			1					34.		21.
	with the problem.	4	2.2	9	6.1	35	19.6	70	6	59	8
7.	I can make a decision	5	2.8		2.8	31	17.3	58		80	
8.	I think before making my	4	2.2	1	5.6	41	22.9	58	29.	66	53.
	choice.			0					1		1
9.	The more information I	4	2.2		3.4	30	16.8	41		98	
	know, the better able I am to			1					39.		33.
	make a choice.	2	1.1	1	16.2	29	16.2	63	1	81	0
10.	I have learned that some			5					32.		44.
	choices are better than others.			1					4		7
				0					32.		36.
									4		9
				6							
									22.		54.
				4					9		7
									35.		45.
									2		3

Question 3-What proportion of variance in Mississippi 4-H Shooting Sports State Invitational qualifiers leadership and decision making skills can be attributed to each selected characteristic: age, ethnic background, gender, number of years in 4-H, number of years in 4-H shooting sports, and number of hours practiced per week?

Several statistical techniques were used to determine the proportion of variance between each of the dependent variables (leadership life skills and decision making life skills) and all of the independent variables (age, race, gender, number of years in 4-H, number of years in 4-H SSP, and number of hours practiced per week). The techniques included correlation coefficient analysis, descriptive statistics, and multiple regression analysis.

Correlation coefficients (Pearson's r) were calculated between the Youth Leadership Life Skills Development Scale (YLLSDS), Decision-making Life Skill Development (DMLSD), age of participants, number of years in the 4-H Youth Development Organization, and years in 4-H SSP. The purpose of these measures of association was to assess the overall relationships between the selected variables and the dependent variables of level of self perceived leadership life skills development and decision-making life skills development.

As shown in Table 3, overall leadership life skills and overall decision-making life skills development had a high correlation (r = 0.576). Years participated in 4-H Shooting Sports and years participated in the 4-H Youth Development Organization had the highest correlation at the 0.01 level (r = 0.718). Overall YLLSDS and age had a correlation with a r of 0.162. Overall DMLSD and age also had a correlation (r = 0.160). A low correlation was between overall YLLSDS and years in 4-H SSP (r = 0.170).

Using a correlational regression analysis of both leadership life skills and decision-making life skills scale all the independent variables were assessed for variance explained. The total r^2 of YLLSDS was 0.080 (Table 4). The r^2 of DMLSD was 0.083.

Table 3
Variable Correlation Analysis (Pearson correlation Sig. (2-tailed))

Youth Leadership Life Skill Development Scale	.576 .000	.162 .036	.039 .616	.170 .027
Decision-making Life Skill Development Scale		.160 .038	.079 .306	.122 .114
Age			.126 .104	.140 .071
Years in 4-H Youth Development Organization			1	.718 .000

Age accounted for 0.024 of the variance compared in a regression analysis YLLSDS ($r^2 = 0.080$). Age explained 0.023 variance compared in a regression analysis of DMLSD ($r^2 = 0.083$) (Table 4).

Table 4
Total Regression Analysis

	YLLSD r^2	DMLSD r^2
Variance Explained by		
Age	0.024	0.023
Gender	0.016	0.031
Years in 4-H	0.017	0.001
Years in 4-H Shooting	0.036	0.005
Sports	0	0.011
Hours spent practicing	0.80	0.083
Overall		

4-H Youth Development is available to youth from the age 8-18 as of January first. For example, a youth who turns 9 years old on January second will be considered 8 years old according to 4-H age because they were 8 years old on January first of that year. For this research, only senior 4-H members were allowed to participate at the state level competition. The ages ranged from 14-18 in 4-H Youth Development age. The actual ages of the youth ranged from 14-19, as shown in Table 5. The mean actual age of participants in this survey was 16.1 years old. The majority of the participants ranged in age between 15 and 17 (Table 5).

Table 5
Age Frequency

Age	Frequency	Percent	Valid Percent
14	24	13.4	14.3
15	35	19.6	20.8
16	41	22.9	24.4
17	42	23.5	25.0
18	25	14.0	14.9
19	1	0.6	0.6
Total	168	93.9	100.0
Missing	11	6.1	
Total	179	100.0	

One respondent indicated an African-American ethnic back ground. Because the participants were predominately Caucasian, researchers cannot make conclusions regarding race.

The participants were predominately male, of the 167 complete surveys, 128 (76.6%) were male and 39 (23.4%) female. Males had an overall leadership mean of 2.13 with a standard deviation of 0.59. Females had an overall leadership mean of 2.29 with a standard deviation of 0.49 that was slightly higher than the overall decision-making mean for males of 2.90 with a standard deviation of 0.71. The overall decision-making mean

for females was again slightly higher than the males at 3.2 with a standard deviation of 0.62.

Gender accounted for 0.016 of the variance in the YLLSDS regression analysis. Gender represents 0.031 amount of variance in the DMLSD regression analysis. Gender explains the most variance compared with the other variables in the decision-making regression analysis (Table 6).

Youth can enroll in the 4-H Youth Development Program at the age of 8 and participate until they are 18 years old. This allows a youth to be involved in 4-H Youth Development Program for ten years. Number of years in 4-H account for 0.017 of the variance explained in a regression analysis of Leadership Life Skills. Number of years in 4-H explained for 0.017 of the variance compared in a regression analysis of DMLSD (Table 4).

The 4-H SSP is available for youth as they first become involved in the 4-H Youth Development Program from 8-18 years old. The mean number of years involved in 4-H Shooting Sports from those surveyed was 3.61 years. Number of years in 4-H SSP explained 0.36 of variance in the YLLSDS regression analysis. Number of years in 4-H SSP accounted for the greatest about of variance for YLLSDS. Number of years in 4-H SSP account for 0.005 of the variance in the DMLSD regression analysis. Number of years in 4-H SSP gives an explanation for the highest amount of variance among all the variables in the YLLSDS regression analysis (Table 4). A youth must be a member of 4-H Youth Development Organization in order to be involved in the 4-H SSP.

Youth were asked on average how many hours they practiced shooting per week. They were allowed to choose from seven increments of time: 0 hours, 1-3 hours, 4-6 hours, 7-9 hours, 10-13 hours, 14-15 hours, and greater than 15 hours. Compared in a regression analysis YLLSDS 0 variance due to hours practiced per week regression analysis in YLLSDS. Compared in a regression analysis 0.083 r^2 DMLSD account for 0.011 of the variance due to hours practiced per week (Table 4).

Conclusions

Life skills are an important cognitive developmental aspect of youth. Positive youth development organizations such as 4-H Youth Development Organization emphasize learning life skills through different programs. 4-H SSP is one of these programs that teach life skills. Leadership and decision-making life skills are two important life skills youth need to develop in order to become successful adults helping youth become responsible and contributing members of society. 4-H SSP utilizes curriculum, practices, and competitions to teach youth leadership and decision-making life skills. The study sought to determine to what degree youth perceive they learn leadership and decision-making by participating in the 4-H SSP.

The mean YLLSDS for the youth surveyed indicated a gain in leadership and decision-making life skills through participation in 4-H Shooting Sports Program. The

mean participant in the program is a Caucasian male 16 years old, has been participating in 4-H Youth Development Organization for 5 years, has been participating for 4 years, and practices 4-6 hours per week.

Youth participants in 4-H SSP perceived themselves to have more than moderate gain in leadership life skills and more than often utilize decision-making life skills. This increase in life skill development in youth who participate in 4-H Youth Development programs was consistent with other studies. Maass, Wilken, Jorden, Culen, and Place (2006) also used the Targeting Life Skills Model in their cross sectional quasi-experimental survey study of elite Oklahoma 4-H alumni study to determine 4-H participation increased development of life skills.

The findings of this study were consistent with the results of other studies of 4-H SSPs in that participating youth show increased life skills development. Studies from New Mexico, Louisiana, and Minnesota found that 4-H SSP were instrumental in developing life skills in youth participants. Wendy Hamilton and Kenneth Sabo used the New Mexico 4-H SSP using high risk youth from low income housing (1997). Through this study, Hamilton and Sabo were able to assess the life, character building, and gun safety skills that these high-risk youth gained through their involvement in the New Mexico 4-H SSP. An impact report on the Louisiana 4-H SSP that evaluated 4-H youth involved in a state shooting sports competition given the opportunity to develop life skills such as self esteem, responsibility, respect, citizenship, and trust (Reed, 2001). Researchers from Minnesota discovered that 4-H SSP is a fun way to develop life skills and those life skills can carry over to other contexts such as work and school (Hauer & Carlson, 1999).

Overall leadership life skills and overall decision-making life skills development were positively correlated. Both leadership and decision-making development are part of the complete life skills needed for youth to be a successful adult. The correlation between these life skill development is good news for the 4-H SSP. The program is working toward its goals of youth life skill development and influencing youth's future in a positive way.

Age relation for this study found the older the youth became the better leadership and decision making skills were. Overall YLLSDS and overall DMLSD age were correlated. Ricketts, Walker, Duncan, and Herren (2007) studied YLLSDS and found the beef project effective in developing leadership and life skills because the YLLSDS scores were high. They did not find that leadership increased in participants based on age. A difference was found for gender life skill development. Females rated themselves to have higher leadership and decision-making life skills development than males.

Years participated in 4-H SSP and years participated in the 4-H program were positively correlated. This is logical because youth have to be involved in 4-H Youth Development to be a participant in the 4-H SSP. The longer participants were involved in 4-H and 4-H SSP the better YLLSDS and DMLSD scores indicated.

Recommendations

Based on findings and conclusions of this study, the following recommendations are offered to University Extension Service:

1. Develop promotional materials emphasizing the 4-H SSP in influencing youth gain in leadership and increase use of decision-making life skills.

2. Increase leadership and decision-making life skills and their use by 4-H SSP participants through additional activities targeted at these areas.

3. 4-H SSP is a way to keep white males involved in 4-H program through age 14-18 at a time when the population is decreasing in other 4-H projects. This program should be marketed to this population

4. Encourage county agents with a high minority population and other youth at-risk to participant 4-H SSP.

5. Use results from this study to gain support and funding for all areas of the 4-H SSP.

6. Encourage more first year 4-H Youth Development participants to join 4-H SSP to increase number of senior 4-H membership and aid in retention of these members.

Based on findings and conclusions of this study, the following recommendations are offered for further research:

1. Conduct a similar study with youth participating in 4-H SSPs in other states to compare results to that found in this study.

2. Conduct a similar study with youth participating in other 4-H Youth Development project areas.

3. Repeat this study with juniors and seniors within the 4-H SSP at the District competition level to determine how leadership and decision-making life skills changes with maturity.

4. Conduct a comparative research between youth who participate in 4-H SSP and youth who are not involved in the program.

5. Repeat this study in subsequent years to determine gains in leadership or decision-making life skills over time.

6. A study of 4-H SSP alumni who are now in adults would provide more insight to long-term benefits from participation in the 4-H SSP.

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Leadership And Decision-Making Life Skill Development
In 4-H Shooting Sports Participants

Discussant: Dr. Jennifer Williams, Texas A&M University

Give the reader (and watchers at the meeting) more information about how shooting sports works. It seems like leadership would be a side benefit from participation. Is it more they are participating in a structured activity or does the program have built in leadership development?

Regarding research question one, it would have been helpful to see a different breakdown on the findings. Could you have grouped them together in categories (personal leadership development, diversity or inclusion, etc) and then ran the stats. That might give us better insight into the phenomenon than a lump score. It is interesting they see team leadership coming from an individual sport. Explore that more.

I'm not sure all of your stats were needed. Some of the statistics ran on research question three seem not to match your research objectives. Just because you ran the stat does not mean you should always report it. Correlation between years in 4-H and years in shooting sports do not reflect on your theoretical model or your research question. What does that have to do with leadership and decision making? Explore the age and decision making more. There is a vast amount of literature out there to support what you found.

SOCIETAL IMPACTS OF LEADERSHIP DEVELOPMENT IN COLLEGE STUDENTS: THE INTERACTION OF MOTIVATION, POLITICAL SKILL AND GENDER

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Allison H. Britton, University of Florida
Andrea Lauren Andrews, University of Florida

Abstract

This study analyzed the use of positive political skills and sources of motivation reported by male and female college students involved in a leadership program compared with students from the general student body. Findings indicated that male college students not involved in leadership training or education were less authentic, sincere and genuine in their interactions with others and were more likely to be motivated by extrinsic sources (money, fame, power). Female college students (regardless of leadership training or education) and male students with leadership training or education reported a more authentic approach to leadership skills and more balanced sources of motivation between intrinsic and extrinsic factors. This study sheds light on the influx of females into leadership positions in agricultural and other organizations as well as provides evidence for the importance of leadership education programming at the collegiate level.

Introduction

A shift in the demographic makeup of agricultural vocations and organizations has brought changes to the profession. While the agricultural profession has been perceived to be dominated by males (Foster, 2001), recent accounts have suggested that agricultural organizations such as FFA, student organizations in general and agricultural leadership education programs have seen a substantial increase in not only female membership, but females in leadership positions (Ricketts & Rudd, 2004; Ricketts, Osborne, & Rudd, 2004; Zielinski, 1999). This trend toward increasing involvement by females in leadership positions is not unique to agricultural professions and organizations, but has been shown to exist across all major industries (Federal Glass Ceiling Commission, 1995).

Both men and women in leadership positions have managed to navigate through somewhat tumultuous experiences with effective use of interpersonal skills, networking and self-monitoring (Ferris, Treadway, Kolodinsky, et al., 2005). Luthans, Hodgetts, and Rosenkrantz (1988) argued that successful leaders used these types of positive skills rather than simply focusing on performance, career success and hard work. Often considered to be political skills, Ahearn, Ferris, Hochwater, et al. (2004) stated that leaders must have "…the ability to effectively understand others at work, and to use such

knowledge to influence others to act in ways that enhance one's personal and/or organizational objectives" (p. 311).

However, social constructions of acceptable female leadership behaviors may inhibit the effective use of Ahearn, et al.'s (2004) political skills by female leaders. While women continue to rise to new heights of leadership within agricultural organizations, hurdles continue to exist. Eagly and Carli (2007) likened a woman's path to leadership as traversing through a labyrinth with unexpected turns, dead ends, roadblocks and confusion. Ely (1995) posited that socially constructed views of female behavior were not congruent with leadership positions. Counter-productive social constructions have led to negative associations with female leadership behaviors as women try to balance behaviors perceived to be more masculine such as authoritative, confident and motivated with socially constructed feminine behaviors such as caring, compassionate and kind (Eagly, Makhijani, & Klonsky, 1992). Based upon social constructions and developmental opportunities, men and women have different approaches to leadership, which may impact the effectiveness of leadership development programs.

This study examined the use of political skills and motivational sources of male and female college students who were involved in leadership positions or leadership development programs at a large land-grant institution versus students who regularly attended classes but were not taking active leadership roles on campus and were not involved in a leadership development program. The study proposed that male and female student leaders would differ in their use of political skills and motivation from the general student population. Examining self-reported use of political skills and motivational sources is useful not only in determining why and how some students become leaders but also is important in focusing and targeting the development of leadership capacity in student leaders and within the general student population. This study seeks to address two priority areas of the National Research Agenda. The National Research Agenda for Agricultural Education and Communication stated that development and dissemination of effective leadership education programs and supporting leadership opportunities for underrepresented populations are two priority areas for agricultural leadership.

Conceptual/Theoretical Framework

For leaders, perceptions of leadership ability and effectiveness are often associated with espoused behaviors versus ideal behaviors. Eagly and Johnson (1990) argued that social role theory explains this phenomenon by suggesting that individuals will behave in accordance with preconceived notions about the role in which that person occupies. Individuals who can be classified into defined roles (i.e.—leader) will adjust behaviors based upon the norms of that role. Leadership role expectations are amplified by gender role expectations and norms. Gender roles refer to "…shared expectations (about appropriate qualities and behaviors) that apply to individuals on the basis of their socially identified gender" (Eagly, 1987, p. 12). Females have largely been considered to fulfill more supportive and interpersonal roles whereas males are considered more likely to fulfill functional roles such as the primary breadwinner and negotiator (Eagly, 1987).

Gender roles have an implicit manifestation in the functionality of an organization and for organizational leaders (Gutek & Morasch, 1982). Female leaders often experience a differential between female gender role norms and leadership role norms (Eagly & Carli, 2007). Gender roles and stereotypes has been a widely researched topic (Quinn, Macrae, & Bodenhausen, 2007). Researchers have concluded that most individuals possess beliefs regarding gender specific behaviors.

Eagly, Johannesen-Schmidt, and Van Engen (2003) found that gender roles have spill-over effects into the practice of leadership within organizations. Female leaders scored significantly higher in the use of transformational leadership behaviors (with the exception of idealized influence-behavior scale) and the use contingent rewards (Eagly, et al., 2003). Male leaders displayed significantly higher use of passive management by exception, active management by exception and laissez-faire leadership (Eagly, et al., 2003). In contrast with transactional leadership behaviors and laissez-faire leadership, transformational leadership behaviors have shown to produce extra effort from followers as well as increase satisfaction with and perceived effectiveness of the leader (Judge & Piccolo, 2004). Eagly, et al. (2003) examined these three outcomes between genders and found that female transformational leaders scored significantly higher on effectiveness, extra effort and satisfaction scales when compared with males who typically engage in transactional leadership behaviors. This finding is consistent with Kotter's (1978) finding that the most effective managers spend up to 80 percent of their day focusing on community and relationship development within the team.

Political Skills

Moss (2006) argued that while the analysis of leadership behaviors such as transactional and transformational is important, a similarly important examination is leaders' use and control of power and influence of followers. Ahearn, Ferris, Hochwarter, Douglas, and Ammeter (2004) categorize this behavior as political skill. Ahearn, et al. (2004) defined political skills as "the ability to effectively understand others at work, and to use such knowledge to influence others to act in way that enhance one's personal and/or organizational objectives (p. 311). Ferris, Treadway, Kolodinsky, et al. (2005) stated that politically skilled individuals utilize four unique skills: *networking* (an ability to deliberately construct and utilize diverse networks of people), *social astuteness* (an ability to keenly interpret social interactions and accurately understand behaviors of oneself and others in social situations), *apparent sincerity* (the possession of or apparent possession of high levels of integrity, authenticity, sincerity and genuineness), and *interpersonal influence* (an ability to subtly and convincingly exert influence on others).

Commonly, engaging in political behaviors is interpreted as negative, unproductive and self-serving (Douglas & Ammeter, 2004). However, recent studies have found that use of the positive political skills described above can be beneficial and useful for organizations and employees (Ahearn, et al., 2004; Moss, 2006). Kolodinsky (2003) found that employees were more committed to their jobs, experienced fewer job tensions and reported higher overall job satisfaction when their supervisor utilized a

moderate amount of political skill. Similarly, Fedor, Maslyn, Farmer, and Bettenhausen (2003) reported that leaders who utilized positive political skills had followers who were satisfied with their supervisor and satisfied with their work group. Even more importantly, Ahearn, et al. (2004) reported a significant, positive correlation between leader's use of political skills and team performance.

Moss (2006) conducted an analysis of political skill and leader motive in terms of the ability to exercise altruism. She concluded that altruism was an important component of the use of leader political skills but that greater insight could come from further examination of leader motives and the use of political skills. Based upon this work, it is important to consider the motivation of individuals in conjunction with political skills.

Sources of Motivation

Many perspectives of motivation have been have been examined. These perspectives include need-based (Maslow, 1954; McClelland, 1961), intrinsic (Deci, 1975), social identity (Ashford & Mael, 1989), value-based (Etzioni, 1961), self-concept based (Brief & Aldag, 1981) and developmental (Kegan, 1982). More recently, scholars have examined work motivation which is defined as the process by which behavior is energized, directed and sustained in organizational settings (Steers, Bigley & Porter, 2003). Much of the research on work motivation has been conducted from the content-based perspective. Content-based motivation refers to an assumption that an individual possesses unique factors that energize, direct and sustain work-related behavior (Steers, et al., 2003). Motivating factors have been differentiated into extrinsic (or external) factors and intrinsic (or internal factors) (Deci, 1975). Deci (1975) described intrinsic motivation as an individual's obtainment of pleasure from enjoyment of the task. Extrinsic motivation occurs when an individual engages in an activity or task because completion leads to external rewards such as money, promotion, or grades (Deci, 1971). Leonard, Beauvais and Scholl (1999) proposed an integrative taxonomy of work motivation that further differentiated external and internal sources of motivation. Leonard, et al.'s (1999) taxonomy included five sources of work motivation including three intrinsic sources (intrinsic process motivation, self-concept internal and goal internalization) and two extrinsic sources (instrumental motivation and self-concept external motivation).

Internal sources of motivation. Leonard, et al. (1999) suggested that intrinsic process, self-concept internal and goal internalization were three types of internal motivators. Intrinsic process motivation refers to motivation due to the enjoyment of the task. The work itself becomes motivational for the individual due to sheer enjoyment of performing the task (Barbuto & Scholl, 1998). Self-concept internal motivation drew from McClelland's (1961) need for achievement, Deci's (1975) notion of an internal motivating force to overcome obstacles and Katz and Kahn's (1978) description of an individual's motivation to achieve ideal role performance based upon internal factors. Individuals set internal standards for traits, competencies and values as a basis for the ideal self. This ideal self motivates individuals to engage in behaviors that reinforce such internally derived standards and, ultimately, higher levels of achievement (Leonard, et al.,

1999). Finally, goal internalization incites motivation because of belief in the cause of the organization. Goal internalization motivation does not necessarily imply value congruence between the individual and the organization.

External sources of motivation. Leonard, et al. (1999) suggested that instrumental motivation and self-concept external motivation were two types of external motivators. Instrumental motivation evolved from Barnard's (1938) exchange theory as well as expectancy theory and equity theory which presumed that organizations and employees enter into exchange relationships where external factors such as money or promotion drive employee motivation to perform a task (Leonard, et al., 1999). Self-concept external motivation refers to motivation that is primarily other-directed. Motivation comes from affirmation of values, competencies and traits (Barbuto & Scholl, 1998). This motivation is similar to McClelland's (1961) need for affiliation and Alderfer's (1969) relatedness needs.

Leonard, et al.'s (1999) sources of work motivation have been found to be antecedents to transformational leadership behaviors (Barbuto, Fritz, & Marx, 2000), influence tactics (Barbuto, Fritz & Marx, 2002), watch-wearing behaviors (Spencer, 2001), organizational citizenship behaviors (Barbuto, Brown, Wheeler & Wilhite, 2003), transformational, transactional and charismatic leadership (Barbuto, Cundall & Fritz, 2005), influence triggers (Barbuto, 2000), locus of control (Barbuto & Story, 2008), and mental boundaries (Barbuto & Story, 2007). Other research has found cross-cultural differences in work motivation (Barbuto & Gifford, 2007).

Purpose/Objectives

The purpose of this investigation was to examine the use of political skills and sources of work motivation between male and female college students to determine if political skill and motivation are related to the development of leadership capacity and involvement with leadership in collegiate and community organizations. Further, this study sought a deeper understanding into the leadership differences between male and female college student leaders in an effort to further examine the increase of females in leadership positions. The objectives of this study were to:

1. Describe the self-reported sources of motivation utilized by male and female college students,
2. Describe the self-reported use of political skills utilized by male and female college students,
3. Differentiate motivational sources and use of political skills between general male students and male students in leadership programs or leadership positions,
4. Differentiate motivational sources and use of political skills between general female students and female students in leadership programs or leadership positions,

5. Compare use of political skills and motivational sources of male and female students (both general students and those in leadership programs or positions), and
6. Analyze the interaction between motivational sources and political skills on student leadership development.

Research Methods/Procedures

This study employed a quasi-experimental design to test the interaction of political skills and motivation between male and female college students who participated in a leadership development program or held a leadership position versus male and female college students who did not participate in such activities (general students). A two-way ANOVA was employed in the analysis to assess the main and interaction effects of two continuous variables between four groupings (Chin, Marcolin, & Newsted, 1996).

This study was conducted of students at a large land-grant institution. Participants of the study were obtained through snowball sampling procedures and consisted of students involved in a leadership development program or leadership position on campus and students from the general student body. Snowball sampling procedures were used to obtain an acceptable sample size even though targeted sampling procedures would have been more acceptable and are recommended for any future replications of this study. A total of 287 students completed the online survey of which 72% were student leaders and 28% were general students. Of these respondents, 37% were male and 63% were female.

Political skills were assessed using Ferris, et al.'s (2005) Political Skills Inventory (PSI). The PSI measures the four specific political skills discussed earlier. All four subscales met acceptable reliability with Cronbach's alpha estimates ranging from α=.79 to α=.89. A sample question from the networking subscale is "I spend a lot of time and effort networking with others". A sample question from the apparent sincerity subscale is "When communicating with others, I try to be genuine in what I say and do." A sample question from the social astuteness subscale is "I understand people very well." A sample question from the interpersonal influence subscale is "I am able to make most people feel comfortable and at ease around me."

Motivation was assessed using Barbuto and Scholl's (1998) Motivation Sources Inventory. The five subscales of the original instrument were collapsed into extrinsic and intrinsic motivation following a procedure outlined by Barbuto and Gifford (2008). The extrinsic motivation subscale met acceptable reliability with a Cronbach's alpha estimate of α=.71. A sample question from the extrinsic motivation subscale is "I work hard to find ways to earn more income." The intrinsic motivation subscale met acceptable reliability with a Cronbach's alpha estimate of α=.88. A sample question from the intrinsic motivation subscale is "I work hard when I feel a sense of purpose in the work." Means and standard deviations for each subscale between groups and gender are reported in Table 1.

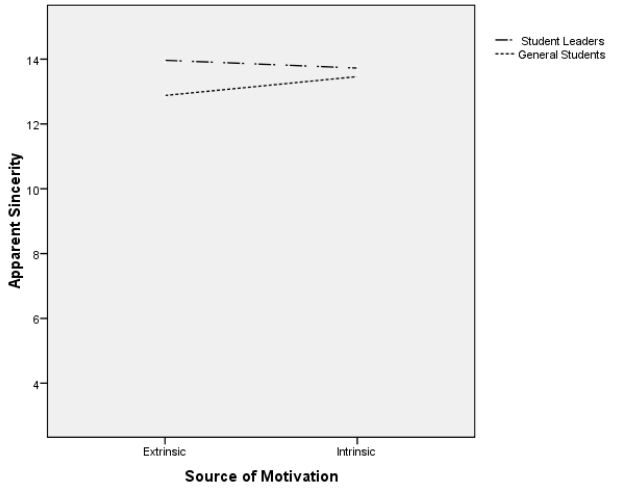
Table 1.
Means and standard deviations for dependent variables

	Males		*Females*	
	Leaders	General	Leaders	General
Networking	22.2 (.61)	21.7 (.86)	21.6 (.44)	21.9 (.71)
Apparent Sincerity	13.84 (1.3)	12.37 (2.5)	13.82 (1.2)	13.64 (1.5)
Social Astuteness	18.6 (2.9)	18.7 (4.2)	19.2 (2.9)	19.9 (2.87)
Interpersonal Influence	16.4 (2.1)	16.1 (3.0)	16.5 (2.1)	16.6 (2.0)
Intrinsic Motivation	32.4 (4.9)	30.9 (6.6)	33.0 (4.6)	32.3 (5.8)
Extrinsic Motivation	32.1 (5.2)	30.6 (6.7)	31.3 (4.9)	30.7 (4.3)

Findings/Results

A two-way analysis of variance was conducted to determine the main effects of political skills and motivation on student leaders versus general students and also between male and female students with a bonferroni correction based upon the number of tested variables. The two-way ANOVA yielded a significant main effect for group membership on only one of the four political skills--apparent sincerity, $F(1,227)=8.74$, $p<.01$ (Table 2). This main effect indicates that students involved in a leadership program or leadership position reported higher levels of apparent sincerity than students from the general population (Figure 1). The interaction effect was not significant indicating that students' sources of motivation did not necessarily affect the ability to engage in apparent sincerity. No other main or interaction effects were found between motivation and political skills on leadership capacity.

Figure 1.
Group differences for apparent sincerity and sources of motivation



A secondary analysis was conducted to separately compare political skills and motivation of male and female students between the two groups (student leaders and

general students) with an appropriate bonferroni adjustment. This analysis revealed a significant main effect between gender on self-reported apparent sincerity, $F(1,226)=9.00$, $p<.01$ (Table 3). The interaction effect was also significant, $F(1,226)=4.91$, $p\leq.05$. This indicates that a combination of gender and group membership contributed to the effect of self-reported apparent sincerity (Figure 2). Male students from the general student body reported the lowest level of apparent sincerity—a significant difference from all other groups. Female student leaders, female general students and male student leaders were not significantly different in levels of self-reported apparent sincerity. No other main or interaction effects were significant for gender effects on use of political skills.

A significant main effect was found between gender and sources of motivation $F(1,226)=7.38$, $p<.01$ (Table 4). Male students reported significantly higher levels of extrinsic motivation than female students (Figure 3). However, the interaction effect is not significant and the main effect for differences in motivation disappears when male students are involved in leadership positions. Female student leaders, female general students and male student leaders report no significant differences in motivation from extrinsic or intrinsic sources.

Table 2.
Two-way ANOVA for Political Skills, Motivation Sources and Group Affiliation

	df	SS	MS	F
Networking				
Affiliation	1	1.73	1.73	.77
Motivation	1	1.87	1.87	.76
Interaction	1	30.10	30.10	.22
Error	217	4268.31	19.67	
Total	221	109176.00		
Apparent Sincerity				
Affiliation	1	19.94	19.94	8.74**
Motivation	1	1.29	1.29	.57
Interaction	1	7.45	7.45	3.26
Error	223	509.08	2.28	
Total	227	42812.00		
Social Astuteness				
Affiliation	1	5.59	5.59	.44

Motivation	1	5.35	5.35	.45
Interaction	1	7.16	7.16	.39
Error	222	2102.82	9.47	
Total	226	84291.00		
Interpersonal Influence				
Affiliation	1	.61	.61	.73
Motivation	1	.02	.02	.96
Interaction	1	1.18	1.18	.62
Error	222	1089.78	4.91	
Total	226	62159.00		

Note: **p<.01.

Table 3.
Two-way ANOVA for Political Skills, Affiliation and Gender

	df	SS	MS	F
Networking				
Gender	1	1.37	1.37	.24
Affiliation	1	4.71	4.71	.07
Interaction	1	22.65	22.65	1.15
Error	216	4240.52	19.63	
Total	220	108920.00		
Apparent Sincerity				
Gender	1	20.18	20.18	9.00**
Affiliation	1	10.06	10.06	4.49*
Interaction	1	11.01	11.01	4.91*
Error	222	498.06	2.24	
Total	226	42668.00		
Social Astuteness				

Gender	1	30.32	30.32	2.38
Affiliation	1	22.30	22.30	3.24
Interaction	1	2.91	2.91	.31
Error	221	2066.91	9.35	
Total	225	84066.00		
Interpersonal Influence				
Gender	1	3.82	3.82	.02
Affiliation	1	.10	.10	.78
Interaction	1	4.20	4.20	.86
Error	221	1078.66	4.88	
Total	225	61963.00		

Note: *p≤.05; **p<.01.

Table 4.
Two-way ANOVA for Motivation Sources, Gender and Affiliation

	df	SS	MS	F
Gender	1	1.70	1.70	7.38**
Affiliation	1	.02	.02	.11
Interaction	1	.48	.48	2.07
Error	222	51.04	.23	
Total	226	142.00		

Note: **p<.01.

Figure 2.
Group differences for apparent sincerity between male and female students

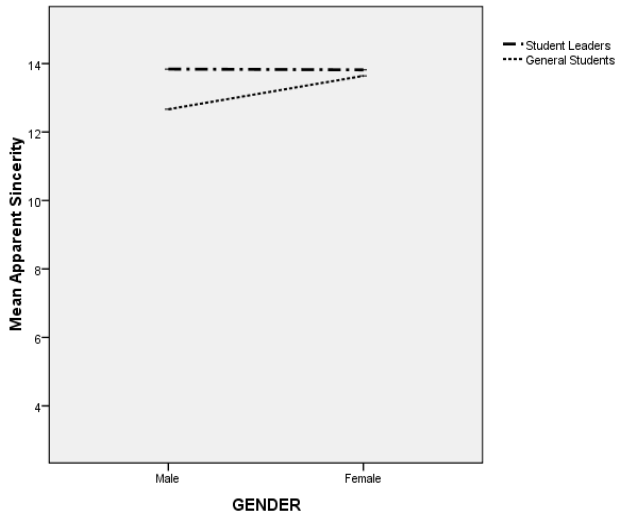
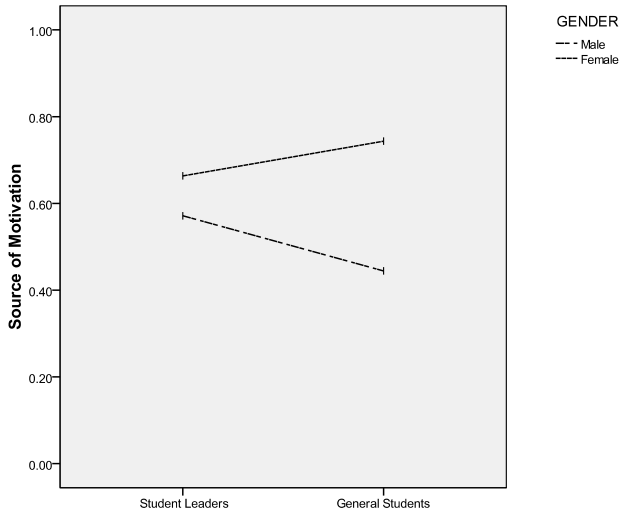


Figure 3.
Gender difference for sources of motivation on group membership



Discussion/Implications

From this study, male students are realizing a greater effect from leadership development programs and leadership positions at the collegiate level. Interestingly, female students were not as affected by leadership development programs or leadership positions as part of their collegiate experience. Males and females differed in their use of apparent sincerity—a skill which indicates that interactions with others are authentic, integrity is valued along with genuineness and sincerity. Males and females also differed in sources from which motivation is derived.

It appears that male students who have the opportunity learn about leadership in either a formal leadership program and/or a leadership position leave their undergraduate collegiate experience with a greater sense of authenticity, higher levels of integrity, genuineness and sincerity. These are important qualities in developing authentic leaders (George, 2007) and have substantive implications for the organizations and communities where these students will make their professional careers.

In addition, male students report higher levels of motivation from external sources such as money, power, status, rewards and reputation. However, when male students are exposed to leadership development programs or leadership positions, these students report more equal levels of motivation from external and internal (values, personal standards) sources. Female students, regardless of leadership affiliations, reported equal levels of intrinsic and extrinsic motivation sources. Again, the effect of leadership development programming or training was greater, in terms of equalizing sources for motivation, for male students than for female students.

Female students reported the ability to utilize political skills regardless of their leadership experiences while in college. Similarly, female students reported an equal

amount of both intrinsic and extrinsic motivational sources regardless of their leadership experiences. These findings are not unexpected. A 2008 study by the Girl Scouts of America found that girls ages 8-17 were likely to reject the notion of formal leadership roles and, thus, the need for formal leadership training (Girl Scout Research Institute, 2008). Instead, the Girl Scouts study reported that female students were more focused on leadership roles which resulted in social change and improving the greater good. In essence, these young female students already saw themselves as leaders and have certain abilities which make leading in non-formal settings easier. Perhaps, the study conducted in this paper and the Girls Scouts study provide some insight into questions raised by Ricketts, Osborne and Rudd (2004) which reported large increases of females in FFA leadership positions. The combination of intrinsic and extrinsic motivation sources, the ability to effectively use political skills and a desire to lead organizations which focus on the greater good or social change have produced a burgeoning increase in female leadership both in collegiate activities and agricultural organizations.

Conclusions and Recommendations

The results of these findings may elicit mixed feelings. On one hand, female students (both leaders and general students) report high levels of authentic and sincere behaviors coupled with equal internal and external motivational sources. This appears to be a well-balanced approach to leadership and life in general. Perhaps this finding can be traced back to the manifestation of gender roles, though this hypothesis needs further analysis.

For male students, this finding may be more troubling. In an era where high profile leaders have recently met their downfall perhaps due, in part, to an inability to act with authenticity, integrity and sincerity coupled with motivation based on extrinsic factors (money, power, status), male students who leave college without the experience of a leadership development program or a leadership position may find themselves without the necessary skills to avoid the missteps that have been so publicly discussed in numerous high profile cases. However, males in this study who are involved in leadership development programs and leadership positions are, in fact, developing a more balanced motivational profile and skills congruent with authentic leadership. This is an exciting and important finding for leadership development at the collegiate level.

For leadership educators, these findings present numerous challenges. First, leadership educators should consider the curriculum to which both female and male students are exposed. Female students seem to be unaffected in terms or authenticity or motivation based upon their collegiate leadership experience. Perhaps the pedagogical approach or curricula could be reexamined to further challenge female students of leadership. For male students, leadership educators may want to place a greater importance on developing positive political skills (particularly apparent sincerity) and balancing sources of motivation between internal and external devices. In addition, with shrinking numbers of male students in collegiate programs and organizations such as FFA, perhaps a greater focus on recruitment of males into these programs may have even broader societal implications.

While these findings shed some light onto the differences between male and female college students and the effects of leadership development and training, much continues to be explored. It is important for future research to fully examine the impact of gender roles on leadership development. Gender roles set certain expectations for males and females in society and may have an effect upon efforts to develop leadership capacity. Future research should strive to further untangle gender roles, leadership skills, motivation and training. By doing so, collegiate leadership programs and leadership training in student agricultural and other collegiate leadership programs may be more effectively targeted.

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Discussant- Jennifer Williams, Texas A&M

Great paper and interesting way to look at gender differences in leadership. In your conclusions, can you find other studies that have looked at teaching leadership to the different genders to see if your results compare from an education standpoint? What does this mean for leadership educators in AGED?

Leadership Strategies Associated with Farmer Adoption of Best Management Practices in a Water Management Province

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By 1998, the nitrate problem in a river basin was a well-documented concern. The Suwannee River Partnership (SRP) was created as a response to a need for collaboration between multiple political and private organizations to solve the nitrogen problem. The main goal of the Partnership is to improve water quality and reduce water usage within the Water Management Province without regulations. The Partnership seeks a balance between protecting natural resources and sustaining the agricultural economy. The purpose of this research was to identify and describe the leadership strategies of SRP that contribute to farmer adoption or rejection of Best Management Practices (BMPs). BMPs are proven to be an economically and technically feasible means of preventing or reducing pollution from non-point sources. Interviews were conducted with SRP key informants to provide a deep understanding of SRP staff members' perceptions of leadership, BMPs and farmers. The results show that profitability and trust are viewed as the most important factors contributing to adoption of BMPs. Key informants believed farmers participate in BMP programs because of the economic savings provided and because farmers trust the one-on-one relationships that the SRP provides.

Introduction

The basic structure for the current national water quality policy and programs was developed by Congress in the Federal Water Pollution Control Act (FWPCA) of 1972. The Clean Water Act of 1977 reorganized the FWPCA and added a major new program to control toxic water pollutants. A significant amendment was the Water Quality Act of 1987, which requires states to submit state management programs to control pollutant discharges from non-point sources (Environmental Law Handbook, 1997).

By 1998, nitrate problems in the Suwannee River Basin were a well-documented concern (Ritchie, 2002). Nitrates in water have several sources, principal among which is agriculture. The Suwannee River Water Management District (SRWMD) was reported having the state's largest area of elevated nitrate concentrations in groundwater (Hornsby et al., 2002). Since the discovery, the major focus was discovering opportunities to assist farmers.

However, the system recognized it was too complex and a coordinated effort would be necessary to have a comprehensive perspective and authority over all aspects (Dedekorkut, 2003). Therefore, the Suwannee River Partnership (SRP) was created in response to the need for the collaborations between the multiple political entities. Formed

in 1999, the Partnership began with 24 stakeholder groups and in 2003 it expanded to include 63 state, federal, and regional agencies, local governments, and private industry members (Dedekorkut, 2003) all interested in improving water conditions within the SRWMD.

The Partnership's primary goal is to improve and protect water quality in the river and the dozens of springs that feed it by reducing nitrate levels in the surface and groundwater within the SRWMD. The Partnership seeks a balance between protecting natural resources and sustaining the region's agricultural economy (Suwannee River Partnership(d), n.d.). The main component of the SRP is the Best Management Practice (BMP) program. BMPs are economical and technologically feasible changes in farming practices designed to reduce polluted runoff and conserve water (Dedekorkut, 2003). Because nitrates come from a variety of sources such as fertilizer and waste, BMPs for most sources and commodities are available (Department of Agriculture and Consumer Services, 2004). A Cost Share Program exists to help farmers compensate for the cost of updating their management techniques to the BMPs.

The SRP developed a Strategic Plan for 2008-2011. As the Partnership evolves, the strategic plan is a way for the leaders of the Partnership to address economic concerns, BMP adoption rates, and expansion to new stakeholders (Suwannee River Partnership, 2008). Currently, the Partnership is unaware of the effects of its leadership and the structure of its strategic plan, programs and materials will allow it to increase adoption of BMPs.

An obstacle in dealing with agricultural problems is rooted in farmers' resistance to traditional one-size-fits-all command-and-control approaches that do not allow flexibility for site-specific application. Farmers view this type of leadership as ineffective and inequitable. It is also their belief that voluntary, proactive participation will achieve results more quickly and at a higher level than the traditional approach (Dedekorkut, 2003). Participants of the Partnership agree that that applying BMPs voluntarily is more efficient than regulations in improving water quality because farmers are doing more than they would do otherwise (Suwannee River Water Management District, 2003).

There is also a significant amount of mistrust of governmental agencies. Farmers believe the government does not have their best interests in mind and have a perception that bureaucracies collaborate to "gang-up" on agricultural production and that regulations result in a direct loss in profits (Dedekorkut, 2003). For now, farmers in the SRWMD have the option to voluntarily participate in incentive-based programs to avoid regulatory intervention. While this option allows the Partnership to persist, there are some criticisms. Some questions exist regarding the long term sustainability of BMPs by farmers due to the voluntary nature of the program. Others wonder if BMPs are inherently effective as a solution to nitrate problems (Dedekorkut, 2003). Environmental groups do not trust the farmers' ability to maintain BMPs in the absence of regulations. Environmental groups would prefer regulations, and maintain that the state should require farmers to obtain permits in the same way as other industries that cause pollution

(Dedekorkut, 2003).

If BMPs do work effectively, it will take a long time to observe recognizable, environmental outcomes. This is especially true for groundwater due to its old age. Therefore, farmer adoption of BMPs is the only measure of assurance that water quality will improve (Dedekorkut, 2003). If the Partnership cannot establish high BMP adoption rates, regulatory actions might be the next step. If regulations are implemented, it is unknown how the farmers' perceptions and attitudes of the Partnership will change. The level of participation could drop dramatically due to rapid change and mistrust. Participating in the Partnership has always been voluntary, if the state forces mandatory compliance, the Partnership loses its appeal and may become unnecessary.

Research Purpose

The purpose of this research was to discover the leadership strategies used by the SRP to reach farmers in the SRWMD to encourage BMP adoption. The researcher examined the influence of SRP staff, programs and materials on farmers. If the leadership of SRP reaches farmers and increases BMP adoption, the overall nitrate levels in the river basin will be reduced, thus making a healthier environment for all residents in the area and helping alleviate some of the struggles arising between humans and their natural resources. The following objectives were used to guide this study:

1. Determine the leadership strategy used by the SRP to reach farmers.
2. Determine the factors that contribute to farmer adoption of BMPs.

Theoretical/Conceptual Framework

The guiding theory for this research was Diffusion of Innovations. The four main elements of the process are the innovation, communication channels, time and the social system (Rogers, 2003). For this research, diffusion was the process by which BMPs were communicated through communication channels among farmer groups of the SRWMD. BMPs are the innovation and farmers within the SRWMD constitute the social system.

An innovation is a concept or object that is perceived as new. Most newly diffused ideas are technologies (Rogers, 2003) and BMPs are a type of technology. Technologies are typically beneficial for potential adopters, however, potential adopters are usually wary of new innovations and do not consider the new idea a superior alternative to a previous practice (Rogers, 2003). Communication transfers ideas between individuals and channels allow messages to pass from one individual to another. Interpersonal channels involving face-to-face exchanges tend to be more effective in persuading individuals to accept new ideas. Most people depend on the experiences of peers to evaluate an innovation, suggesting the importance of interpersonal relationships (Rogers, 2003). The main aspects of the time element of diffusion are the innovation-decision process, the innovativeness of an individual and an innovation's rate of adoption in a system. The innovation-decision process is how an individual passes from first knowledge of an innovation to the formation an attitude toward the innovation and

progresses to a decision to adopt or reject the new idea (Rogers, 2003). This process and its steps are discussed in detail later.

A social system can offer boundaries for the diffusion of an innovation. A social system affects diffusion through its structure, norms, and the roles of opinion leaders and change agents (Rogers, 2003). Structure is how the system is arranged and gives regularity and stability to human behavior so that it can be predicted with some accuracy. Norms establish patterns of behavior for individuals within the system and define a range of tolerable behaviors (Rogers, 2003). Opinion leaders provide information and advice to the members (farmers) of the system. Opinion leaders have technical competence, social accessibility, conformity to norms and serve as a social model. Change agents influence clients' innovation decision in a desired direction. Change agents may use opinion leaders to encourage diffusion (Rogers, 2003).

Innovation-Decision Process

An individual's decision to adopt a new innovation is not an instantaneous action, but a process. The innovation-decision process is a process where an individual passes through several stages, that require choices and actions, which ultimately allow the individual to decide if the innovation will be incorporated into ongoing practices (Rogers, 2003). Prior conditions that affect an individual's innovation-decision process include his or her previous practices, needs, innovativeness and norms.

The first stage in the innovation-decision process is the knowledge stage. In this stage an individual gains initial knowledge and information regarding the innovation. An individual can play an active or passive role becoming aware of an innovation (Rogers, 2003). The second stage of the innovation-decision processes is persuasion. Persuasion, in this process, does not include an assumed direction of persuasion, but an attitude formed by the individual. During this stage, the farmer forms a favorable or unfavorable attitude about the innovation. However, all innovations carry some uncertainty because of the hesitance in the innovations ability to function. Individuals seek reinforcement to align themselves with their peers and to reduce uncertainty. Peers offer subjective opinions that are easily attained and more convincing than scientific evaluations (Rogers, 2003).

In the third stage, an individual engages in activities that lead to the individual's decision to adopt or reject the innovation. According to Rogers (2003), farmers will be less likely to adopt an innovation without first being able to try it on a limited basis (trialability). In some cases, demonstrations, can speed up an individual's innovation-decision process (Rogers, 2003). During the fourth or implementation stage, the innovation will be put into practice. Implementation usually quickly follows the decision stage. However, uncertainty typically still exists regarding the consequences of the innovation. The implementation stage may continue for a long period of time until the innovation becomes institutionalized into the adopter's operations (Rogers, 2003).

Evidence shows that the decision to adopt or reject an innovation will not always

be the final step in the process (Rogers, 2003). Therefore, the final stage of the innovation-decision process is confirmation. During confirmation, a farmer will seek additional reinforcement of the innovation-decision already made, and could potentially reverse the decision. A reversal may be especially likely if the farmer is exposed to conflicting messages regarding the innovation. Discontinuance is a decision to reject a previously adopted innovation (Rogers, 2003). Discontinuance can occur if a replacement innovation exists that is better than the original or if the adopter is dissatisfied with the performance of an innovation.

BMPs are the technology being diffused within the SRWMD system. There are six types of BMPs recognized frequently in literature: landscape, soil, nutrient, pest, water, and livestock. The adoption of each type of BMP has been influenced by a multitude of variables (Prokopy, Floress, Klotthow-Weinkauf & Baumgart-Getz, 2008) that influence the innovation-decision process. Some of these variables are not controllable by the farmer but still influence farmer behavior and decisions (Kaiser, Wolfing & Fuhrer, 1999). For this research, the different variables were placed into three categories: farmer attitudes, farm and farmer characteristics and economics.

Farmer Attitudes

Kaiser, Wolfing and Fuhrer (1999) found that environmental attitudes explain 40 percent of the variance in ecological behavior intent, such as intention to adopt BMPs. Therefore, environmental attitudes were a significant precondition of ecological behavior intention. Smathers (1982) concluded that a farmer's attitude and perception would likely be the most influential factor for successful adoption of conservation practices. A gap between a value of the environment and intent to adopt conservation practices may arise from a difference between an individual's perception of the environmental condition and the actual condition (Seitz & Swanson, 1980). A study in Utah showed that when agencies reported significant areas of degraded riparian land, 84 percent of the respondents believed that the riparian areas on their land were in good or excellent condition. The farmers in this study had a positive attitude toward natural resources but did not recognize that they were a part of the problem (Corbett, 2002).

Overall, attitudes are frequently positively associated with adoption, though the association has usually been moderate. In addition, attitudes towards the environment and quality of the environment have never been found to have a negative relationship with adoption (Prokopy et al., 2008). Perceptions and attitudes about new conservation practices are also influenced by information disseminated and the information's source (McBride and Daberkow, 2003).

Farm and Farmer Characteristics

Historic explanations for differences in adoption identify factors such as farm size, farmer education, farmer age, farm type, farm tenure, farmer gender and land quality or productivity (Prokopy et al., 2008). However, no consistent conclusions have been made to measure farms against for future prediction of adoption. A lot of heterogeneity

exists amongst farms and farm operators, leading to varying adoption rates (Khanna & Zilberman, 1997). For instance, farm size had been found to influence the adoption decisions (Feder & Slade, 1984) and farm size has been a poor predictor of conservation practice adoption (Alonge & Martin, 1995).

Generally, acreage, education and diversity are more positively correlated with BMP adoption than negatively correlated (Prokopy et al., 2008). However, some research has found education to be a poor predictor of conservation practice adoption (Alonge & Martin, 1995). Capital and income are never significant for water management BMPs. There is also mixed evidence for farmer experience and tenure. Both typically have a more negative influence on adoption, but when selecting for a specific BMP type there is no discernable trend. Age has mostly a negative relationship with BMP adoption but is never significant for water management practices (Prokopy et al., 2008). Studies have found that age was inversely related to support for conservation practices. Older farmers were less likely to adopt due to higher uncertainly levels when exposed to a change in technology (Rahelizatovo & Gillespie, 2004). The more labor available to the farm, the more likely the farm adopted BMPs, except in water management, where the evidence is unclear. The ownership type of a farm has equally positive and negative influences on adoption. Animal farms and other types of farms are more likely to have a negative relationship with adoption while grain farms are more likely to have a positive relationship with adoption (Prokopy et al., 2008). Female gender has also been related to positive environmental attitudes and higher probability of adopting conservation practices (Christianson & Arcury 1992). Fuglie and Kasack (2001) found large regional differences in the rate of adoption of conservation practices.

Economics

BMPs are relatively new technologies that usually require a significant up front investment with a perceived uncertain payoff (McBride & Daberkow, 2003). Perceived profitability has been found to be the most important factor affecting the adoption of conservation practices (Saltiel, Bauder & Palakovich, 1994). The USDA believes that the management strategies to protect groundwater are generally profitable for farmers. In spite of this, not all farmers who could adopt the practices have done so, even though the practices should boost profitability (Cooper & Keim, 1996).

Even though the practices appear profitable, a level of uncertainty still existed that was too large to overcome, unless demonstrated satisfactorily by a peer (Cooper & Keim, 1996). Farmers with smaller, less specialized operations have been more tentative in adopting new practices because of financial risks associated with start up costs (Saltiel, Bauder & Palakovich, 1994). Gamon, Harrold and Creswell (1994) found that farmers were more interested in long-term profitability of BMPs than short-term.

Alonge and Martin (1995) showed that farmers wanted educational efforts and research to be directed toward improving the profitability and compatibility of sustainable practices to improve the ease of farmers' transitions from conventional to sustainable practices. Observation also indicates that BMPs deemed more economically

viable are adopted at the greatest level (Rahelizatovo & Gillespie, 2004)

Procedures

A qualitative research approach was selected. The need for this approach was to view the social phenomenon holistically and give a broad panoramic view rather than a micro-analysis (Ary Jacobs, Razavieh & Sorensen, 2006). Since this research project was the first evaluation of the Partnership's leadership strategies, an emphasis was placed on generating in-depth and well-rounded information. Given this, a qualitative research design was the most appropriate and offered the best starting point for the Partnership.

Interviews were the qualitative approach used to obtain information. Interviews captured attitudes and feelings of participants and created awareness of issues that were unobservable to the researcher (Patton, 2002). The interviews gathered data from participants in their own words and provide information that could not be obtained from observation.

Semi-structured interviews allowed for discussion to be guided but not controlled by questions. The interviews were flexible, allowing new questions to be formulated during the interview as a result of the interviewee's comments. This interview style allows participants to discuss freely and as much or as little as they desired. The goal was to give participants a chance to express their opinions, while allowing the researcher to gain insight into how they understand and feel about the topics or issues.

The participants of the study were Partnership key informants. Key informants are knowledgeable individuals who often offer invaluable insights and often provide detailed information about a group's past in addition to the contemporary happenings and relationships within the group (Fraenkel & Wallen, 2006).

The key informants for the study were chosen from the staff contact list on the SRP website. Four contacts are listed, and all four were interviewed. A fifth key informant, a local Extension agent and assistant to the Partnership, was added to give an outside perspective which made the information gathered during interviews well rounded. The five key informants interviewed, all of which had worked with the Partnership for at least three years, included: the Partnership coordinator, the assistant coordinator, a SRWMD technical programs manager, a FDACS environmental specialist, and an Extension agent. The interviews were conducted face-to face in August 2009.

Prior to the study the researcher had never worked with the SRP, FDACS, SRWMD or any of SRP's 63 partners. Therefore, the researcher had no political or personal ties to any of the agencies or private businesses involved in the study. However, throughout the research process the researcher tried not to impose a personal agenda or bias and was open to participant responses. The researcher also made sure not to over-cue an interviewee and used reflexivity to control for bias. Reflexivity allowed the researcher to self-reflect in order to actively seek out biases (Ary Jacobs, Razavieh & Sorensen, 2006).

An interview guide was developed in accordance with the study's purpose and theoretical perspective. A panel of experts reviewed the interview guide, afterwards it was pilot tested. The purpose of the interview guide was to provide a framework for each interview to ensure interviewer maintained a level of consistency among participants. Specific follow-up questions were posed to participants as they presented themselves and were relevant and appropriate to the discussion (Patton, 2002). Maintaining an open rapport allowed for each participant to reflect and discuss his or her unique perspectives regarding their experiences. All key informant interviews were audio recorded so that the full dialog, including all major points offered by participants, was captured.

Before data was analyzed interviews were transcribed. The researcher elected to use Weft QDA for assistance in data analysis. Transcripts from the focus groups were imported into Weft QDA software to be analyzed in accordance with Glaser's (1965) constant comparative method ( ).

After finding links and connections among categories, interpretations were made. These interpretations were generalizations based on the connections and common aspects among the categories and patterns. Interpretations went beyond the descriptive data to extract meaning and insights that show what could be learned from the research (Ary Jacobs, Razavieh & Sorensen, 2006).

Qualitative research addresses the validity and reliability through measures of validation formed by credibility, transferability, dependability and confirmability (Ary Jacobs, Razavieh & Sorensen, 2006). Low-inference descriptors, like direct quotations, were used to enhance the credibility. To establish transferability, or the degree to which findings from the study relate to other groups, rich descriptions of the organization, participants and setting were provided. To reduce bias in the procedures and interpretation of the results, confirmability was enhanced by allowing the interview guide to be reviewed and pilot tested.

Findings

The researcher identified and described the strategies employed by the Partnership that influenced, positively or negatively, farmer adoption of BMPs. Coding of the interviews led to three distinct strategy themes. The key informants believed leadership by the SRP development team and by current peers as well as planning led the Partnership to its current success in adoption. Informants also revealed that the two most influential ideas used by Partnership leaders were the developed level of trust between the farmers and the Partnership and the perceived profitability of BMPs.

Leadership and strategy

Each key informant made at least one comment regarding leadership and/or strategy building. Before and during the Partnership's formation, the leaders were purposeful in setting the foundation for success. On participant said "the early leader

that, I think, was one of the reasons we've had success, he just kind of helped set up the approach."

The participants stated that a key aspect of the approach was that everyone believed in it. Since the Partnership is a combination of multiple agencies it was critical for everyone to be on the same page. "The leadership part of it is that you have agency heads and organization heads that have come together. They believe in this approach and they convey that to their staff which helps make everything work," said one participant.

The leadership of the Partnership has also been consistent and involved influential personalities and decision-makers. These leaders can be viewed as the change agents of the organization, specifically hired to influences opinions in a particular direction. One participant contributes adoption success to the fact that "we've been out there we've provided the leadership." Yet another comment was:

> … any organization is dependent on its leaders. Early on we had some very, very good leaders, as well as strong leaders, that were able to move opinions that were able to move groups, they were able to bring groups together. And so, you know, that was number one when we started we had some really good leaders that would help us make decisions and move from point A to point B.

Though the Partnership is confident in its abilities and potential to make an impact in the future the key informants also seemed humble. They recognized that the organization is cannot be perfect, but has made considerable strides in reducing nitrates in the SRWMD by getting farmers to adopt BMPs. For example, one participant said, "without admitting there's some things we still need to continue to work on and strengthen, we've made a lot of progress."

The leadership that started the Partnership and the current leadership within the Partnership have clearly established a firm foundation in their approach to success. A participant commented that "they definitely spend a lot of time planning and thinking about how they can best reach the people." The leaders develop a "plan of action" but also have a chance to "seize those other opportunities as they come along."

The Partnership has also used opinion leaders and recognized laggards. One key informant said the Partnership "identified those leaders, went to them and asked them if they would work with us to implement BMPs." Another participant said,

> …early on we were trying to educate more of the masses and bring them along. And so, we would try to find the early takers and have them help us … to get it going and to get people [to adopt]. You know, there's always those that are willing to take it on first and always those that drag their feet… The Partnership has some that are early takers, that are progressive and they help set opinion and they make lots of noise and we have those that still don't like us.

The Partnership relies on the progressive farmers group to be opinion leaders and

spread information and persuade farmers to favor BMP innovations. The cost-share program allows progressive farmers to have BMPs on their property and "they in turn tell their neighbors." Since a common perception is that the Partnership is a government program, the leaders understand that sometimes "it's a lot more believable if it comes out of somebody else's mouth that you see at a restaurant or see at the equipment dealership or something like that. It gives a lot more credibility to it." One participant suggested that "word of mouth has been the best advertisement."

The Partnership has also been a strategically collaborative organization, "sharing" data and combining resources. There are 63 partners and they believe "each agency has its strengths" and the Partnership has learned "how [they] can support each other." One participant said, "we're going to work together, we're going to solve the problem, we're going to help these guys change their behavior so the can accomplish this."

The last strategy the leaders of the Partnership employed was a big picture viewpoint. They understand that the problems trying to be solved cannot be solved overnight and need a long-term perspective should be used. A key informant came to the conclusion that they must "realize it takes some time to see improvements." Another participant noted,

> Agriculture is not a perfect industry... There's a lot of issues with it one way or another and so our efforts are spent in trying to work through those issues on a voluntary basis and something that will help the farmer be successful.

Trust Relationships

All five of the key informants said that establishing interpersonal relationships with farmers was vital. The Partnership built trust by showing that it understood the farmers' issues and cared about them. In order for farmers to turn to the Partnership, it had to show that there was "a truly valiant effort being made to do the right thing" said one participant. The leadership knew this was important and tried to set a tone of trust from the beginning.

> … evaluations came back that the farmers' perceptions were very positive for the Partnership. And why? I think it has to do with -- if you just had to say in one sentence what it is, it has to do with trust. And that came from, I believe, the leadership early on. We had several key people who were in management … and those key people just kind of portrayed that trust is important, we're here to try to work with people and so that's kind of conveyed all the way through and the people we've hired to make sure that they -- people that can relate to farmers and we try to understand farmers and where they're coming from.

The farmers in the SRWMD are no different than the farmers discussed earlier in their skepticism of the government. One participant mentioned,

> … they're a little more skeptical about governmental programs and, although the

> Partnership has a considerable amount of private industry groups involved in it, it's still perceived as a government program. So, you know, people, farmers are a little bit apprehensive about it being a government program.

According to participants, it's easier to earn the trust of a skeptical farmer if you spend time with them and when you can solve a problem. One participant reflected about their experience with a farmer and said, "probably a lot of his trust and that doesn't happen overnight. I've been working with these -- some of these guys since 1997. So it's more building a relationship with them." When talking about a farmer, another participant said, "the guy's happy 'cause you just solved one of his problems. I mean, if you can solve someone's problem, they're going to be your pal. So, you know, being a problem-solver is key."

Two participants stressed that another aspect of earning farmer trust lies in the ability show that you care and are willing to help. One participant expressed, "people really don't care what you know until they know that you care." Another participant said that "showing that they care and fighting for the farmer" and "being their voice" was critical. Yet another important aspect provided was showing that the Partnership was "not just there to regulate … we're from the government; we're here to help you."

Three of the five participants used the phrase "one-on-one" when discussing relationship building with farmers, for a collective total of 14 times. Six of those involved working with farmers or showing or explaining concepts. This makes it clear that there was no leadership gap between the Partnership's top position and any farmer in the SRWMD. Other comments regarding building "one-on-one" relationships referred to them as "critical" or "crucial" in building trust. Another participant viewed one-one-one conversations with farmers as a daily occurrence to "get that connection." One participant said, "our number one priority now is, especially with less budget to provide for incentives, is one-on-one work with farmers." Another commented "one-on-one contact we have to continue that, that's our goal."

Profitability

A farmer's bottom line is equally important to them as any other American's bottom line. Participants commented that farmers are "resource driven" and that "profitability is one of the high-ranking decision makers." Another participant said that "one of the biggest things you need is money and if you don't have money you don't have much of a program, it's very difficult to move people without money and incentives." One key informant suggested that farmers implementing BMPs is similar to buying auto insurance.

> If you buy auto insurance, probably one of the first considerations that you would have is cost of the auto insurance. Secondly, was probably the amount of coverage, or the types of coverages that you got, or the benefits that you get out of it. And ag producers are no different. They look at, "what's it going to cost me," or "is it going to make me money. Is it going to help me continue in my

business?"

Saving and making money creates buy-in. Whether the savings was communicated and given by SRP or seen through a neighbors operation doesn't matter, if there is an opportunity to increase savings, farmers want to be included. One participant was reflecting on BMPs and said "yes, it's a water quality BMP, but it's helping their bottom line be better." Another key informant discussing the BMP program said "everybody wanted to do it and part of it was we were providing additional money." Yet another participant said,

> …when they see things work, and they see things working for their neighbor and they see, you know, it goes back to economics, then they want to buy into it… I think seeing your neighbor next door using us and not seeing that pivot running as often and realizing he's saving a bundle of money and I'm not. That would certainly, I think, has brought a lot of them on board…But realizing that, you know, they're saving money on their inputs and still getting a decent yield.

Another current topic of concern in the agriculture community is agricultures long term sustainability. One participant stated "all of agriculture's having a serious time, you know, economically, just surviving." Another participant said,

> If we don't make agriculture sustainable, profitable for farmers to be able to stay in the business, whether it's reducing the cost of inputs or increasing the price of the products or both, it's going to be a moot point. The farmers, as much as they would like to, they're not going to be able to stay in agriculture.

A third participant commented specifically on the plight of dairy and poultry producers.

> Even though there's been cost-share incentives provided, they've still got to provide some of their own money. When the industry's hurting, they're doing good to make the feed bill payment and the light bill payment and all the things that go on a dairy. And the poultry industry's in the same boat because they're just barely hanging on there because they've been cutting production.

Farmers cannot afford to waste inputs for their operation. BMPs are beneficial for reducing waste of inputs. However, if there is not enough money to implement the BMPs it is not economically beneficially for farmers. Therefore, farmers are not going participate in a program that isn't profitable. With the cost-share program, the Partnership has generally made BMP implementation profitable. One informant said, "There's really an economic incentive for them to manage these BMP properly because, you know, they don't want to waste fertilizer, they don't want to waste water 'cause it costs them money." Another said, "money is something that is really important to invest for BMPs for farmers 'cause they are not one to waste anything."

Conclusions/Implications

The keys to a successful organization for the Partnership are found in the leadership of the Partnership staff. The important aspects of the leadership are its strategies and its integrity in keeping trustworthy relationships. This study helps fill one of the research priority areas for Agriculture Leadership in the National Research Agenda (Osborne, n.d.) for engaging citizens in community action through leadership education and development and determining the effects of enhanced citizen engagement in building sustainable agriculture enterprises. However, because the analysis is subjective and uses a small sample size, projectability is not possible. The qualitative research conducted produced results but does not necessarily produce definitive conclusions, but provides enough information to establish a firm basis for decision-making.

Money will always be important in keeping the organizations going, but does not solve all problems. One of the participants summarized the themes linked the themes together very clearly by saying "they key is going to be money and leadership you know if we get a degradation in our leadership or if we don't get funding for a long time it's going to be difficult."

Further research should be conducted on opinion leaders and change agents in agricultural settings. The findings of this study suggest that using Diffusion's influential players in the casual social system of agriculture is effective. Further research is needed to confirm or undermine those findings. Additional research should also be performed on other agriculture collaborative organizations that include public and private stakeholders, such as the Partnership. The collaboration has been successful in reaching farmers but, further research would define if this organization is a common or unusual example.

Research should also focus on the notion of one-on-one relationships in organizational leadership. It could be argued that the most important aspect of farmer BMP adoption was the Partnership's deep relationships with their consumers, the farmers. Positive personal relationships increased adoption. Though the Partnership's programs are voluntary, other organizations could use this model to increase trust and therefore productive output.

In the current economic struggle, it will be important for organizations to look outside themselves for collaboration potential. Organizations will be able to accomplish more together than apart by combining and sharing resources. Extension specifically could benefit from collaborating. Extension is stretched for multiple resources including finances and staff. By pulling resources together with organizations that have a similar mission, goals and values, Extension can focus on succeeding and growing rather than maintaining.

This research is also applicable to other organizations trying to increase adoption of conservation practices. These organizations could be reaching out to farmers or homeowners, the findings of this study would apply to both. Organizations should strategize and have an action plan put into place so the path of the organization is clear.

Organizations need to break down their outreach programs into smaller units and need more one-on-one contact with their members and potential members to create trust and loyalty. The study will play an important role in determining how leaders in conservation organizations can emphasize the importance of conservation to agriculture audiences and increase participation in conservation programs

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An Analysis of the North Carolina Cooperative Extension Service's Role in Bridging the Digital Divide

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Abstract

The purpose of this study was to determine the perception of North Carolina County Cooperative Extension Directors in relation to the North Carolina Cooperative Extension Service's role in bridging the digital divide. It was perceived by respondents that variables such as income, education, gender, disability status, race/ethnicity, age and geographic location (rural versus urban) are major factors in the digital divide. Recommendations were made regarding North Carolina Cooperative Extension forming partnerships in order to narrow the digital divide in their regions, in addition to developing educational programming efforts in this area for all clientele served.

Introduction

The economic recession of late 2008 has greatly impacted all sectors of society, establishing the fact that mankind today lives and works in a global economy in which factors in one section of the world can have major implications for other geographic areas. This concept of a global economy is greatly shaped by technology, particularly digital technology and information access in the form of the Internet. The Internet today provides increased access to information in real time, which is then utilized by the individuals for personal decision making and by entrepreneurs to shape the future of their respective enterprises. In today's information technology depended global economy, power and money are more and more going to communities that have the ability to connect with the most bandwidth through broadband digital technology. Today's global economy is also greatly impacted by the "green initiative" with its focus upon environmental sustainability for future generations. It is perceived by many that broadband Internet technology is a platform that can empower greener technologies and support environmentally friendly economies (e-NC Authority, 2009). It is estimated that workers who telecommute are already reducing the amount of office space needed by 12 percent; this provides major environmental relief considering that construction related activities account for up to 50 percent of CO_2 emissions (Forum for the Future, 2004).

Given the aforementioned factors can digital technology itself be the major transforming factor in how the global economy and to larger extent the environment as a whole is impacted by mankind. Research suggests that it can, but will be impacted by three major factors:

- The total power of digital technology will only be realized when all individuals are able to utilize it for their personal and professional lives.
- By digital technology being "evergreen", as technology evolves the bandwidth will expand thus have the ability to transmit more information over faster networks. This in essence will require close scrutiny of what

digital technologies are being utilized so adequate networks and bandwidth for communities and economic goals are ultimately achieved.

- With the rapid pace of technological change infrastructure upgrades will be constantly needed, requiring comprehensive and cross cutting planning efforts to maximize the return on the investment made ultimately (e-NC Authority, 2009).

Digital Divide Economics

According to estimates by the U.S. Bureau of Economic Analysis estimates that every dollar invested in broadband digital technology returns another $3 to the economy (Crandall, Jackson, Singer, 2003). In contrast it is also stated that the failure to make this investment has be estimated to reduce productivity one percent per year or more (Ferguson, 2002). It is estimated that in some states a one percent increase in states' broadband penetration results in 0.2-0.3 percent increase in employment. For North Carolina the presence of an increase broadband penetration could bring between 9,100-12,700 new jobs (Crandall, Lehr, & Litan, 2007).

North Carolina and the Digital Divide

With a population of over nine million individuals North Carolina is a very diverse state, that has experienced major shifts in its demographic and economic profile over the past decade (U.S. Census Bureau, 2009; e-NC Authority, 2007). The traditional jobs in textiles, tobacco, and manufacturing have gave way to occupations closely associated with information technology and biotechnology. With this shift it is becoming more evident that communities which do not possess access to broadband technology are at a very profound economic and educational disadvantage. In relation to Internet access in North Carolina as of 2008 83.54 percent of households have access to high speed Internet. In North Carolina twenty-one counties have less than 70 percent access to high-speed Internet service, with four counties having less than 50 percent access, with regard to computers in the home, as of September 2008, in North Carolina 80 percent of households had computers, an increase of 57 percent from 1999. During this same time frame the adoption rate of Internet access increased over 94 percent. When looking at adult computer use 62 percent of North Carolina adults in 1999 reporting using the "Internet Anywhere" (defined as home, work, or public access site), today the percentage has increased to 82.

North Carolina Cooperative Extension and the Digital Divide

The mission of the North Carolina Cooperative Extension Service in relation to community focus is to help build quality communities by training adult and youth volunteers to become community leaders, providing educational programs to stimulate community economic development, working in partnership with other agencies to help citizens prepare for and recover from disasters and more. Through educational programs, publications, and events, Cooperative Extension field faculty deliver unbiased, research-based information to North Carolina citizens (North Carolina Cooperative Extension

Service, 2009). According to the e-NC Authority (2009) all educational organizations including nonprofits should work to encourage **digital literacy**, which is defined as the use and adoption of information and communication technologies (ICT) within their organizations. Given the aforementioned statements and the economic importance of digital technology to the future of North Carolina, what role can the North Carolina Cooperative Extension Service play in bridging the digital divide and in promoting digital literacy?

Theoretical Framework

In order gauge the role of the North Carolina Cooperative Extension Service in bridging the digital divide the theoretical framework for this study was guided by E.M. Rogers's (1995) diffusion of innovations theory. This theory was initially designed to describe patterns of adoption, explain the mechanism, and assist in predicting whether and how a new invention will be successful. According to the diffusion of innovation theory, technological innovation is communicated through particular channels, over time, among the members of a social system. The stages through which a technological innovation passes are knowledge (exposure to its existence, and understanding of its functions), persuasion (the forming of a favorable attitude to it), decision (commitment to its adoption), implementation (putting it to use), and confirmation (reinforcement based on positive outcomes from it). Additionally innovations have certain characteristics: relative advantage (the degree to which it is perceived to be better than what it supersedes), compatibility (consistency with existing values, past experiences and needs), complexity (difficulty of understanding and use), trial-ability (the degree to which it can be experimented with on a limited basis), and observability (the visibility of its results). The diffusion of innovation theory also classifies individuals into technology adopter categories, which directly relates to the considerations that extension personnel must perhaps be concerned with when developing strategies to aid in the closure of the digital divide (Figure 1). The adopter categories are innovators (venturesome), early adopters (respectable), early majority (deliberate), late majority (skeptical), and laggards (traditional).

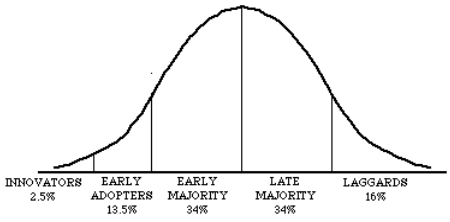

Figure 1. Bell shaped curve showing categories of individual innovativeness and percentages within each category

Innovators and earlier adopting individuals tend not to be different in age, but to have more years of education, higher social status and upward social mobility, be in larger organizations, have greater empathy, less dogmatism, a greater ability to deal with abstractions, greater rationality, greater intelligence, a greater ability to cope with uncertainty and risk, higher aspirations, more contact with other people, greater exposure to both mass media and interpersonal communications channels and engage in more

active information seeking. Innovators and early adopting individuals are so imperative to the technology diffusion process of perhaps closing the digital divide, because they can initially act as the first agents of change in influencing other parties as to the relative advantage of a particular innovation.

Another imperative component of the diffusion of innovation theory concerns the roles that individuals play in the process. Important roles in the innovation process include: opinion leaders (who have relatively frequent informal influence over the behavior of others); change agents (who positively influence innovation decisions, by mediating between the change agency and the relevant social system); change aides (who complement the change agent, by having more intensive contact with clients, and who have less competence credibility but more safety or trustworthiness credibility). The change agent functions are: to develop a need for change on the part of the client; to establish an information-exchange relationship; to diagnose the client problems; to create intent to change in the client; to translate this intent into action; to stabilize adoption and prevent discontinuance; and to shift the client from reliance on the change agent to self-reliance. The aforementioned theory provides the structure for this study in several ways. First in order for the digital divide gap to be narrowed and eventually eliminated individuals must be exposed to the technology and shown the relative advantage of adoption. Secondly the individual must be allowed to practice with the innovation while at the same time infusing the technology into their existing value structure. Moreover, and most importantly the individual must be allowed constant access to the technology in order to allow for trialability.

Purpose and Research Questions

The purpose of this study was to determine the perception of North Carolina County Cooperative Extension Directors in relation to the North Carolina Cooperative Extension Service roles in bridging the digital divide. To accomplish the aforementioned purpose, the following research questions were developed:

1. What are the general perceptions of North Carolina County Cooperative Extension Directors in relation to the socio-demographics characteristics that impact the digital divide in North Carolina?

2. What are the general perceptions of the North Carolina County Cooperative Extension Directors in relation to extension roles in bridging the digital gap?

3. What are the demographics of the North Carolina Cooperative Extension County Directors?

Methodology

The population for this study consisted of all North Carolina County Level Extension Directors (N = 101). The survey utilized for this descriptive study was adapted from a study conducted by Elbert & Alston (2005). The validity of the instrument was originally established by means of content validity. Brown (1983) defined content

validity as “the degree to which items on a test representatively sample the underlying content domain” (p 487). Brown recommended using expert judges as one means of establishing content validity. A panel of experts at North Carolina Agricultural and Technical State University and Texas A&M University, consisting of agricultural education researcher’s reviewed the instrument for content validity. For Elbert and Alston’s (2005) study a pilot test of the instrument was conducted resulting in a Cronbach's alpha reliability coefficient of .88; thus, the instrument was deemed to be reliable. The survey instrument for this study consisted of three sections: Part I. Digital Divide Socio-Demographic Characteristics, Part II. Extension in the Digital Divide and Part III. Demographics. Parts I and II consisted of Likert-type items; Part III consisted of a series of open-ended and multiple-choice items. Sections one and two consisted of twenty-two questions collectively and utilized a five-point Likert-type scale with the following responses: 1=Strongly Disagree, 2=Disagree, 3=Uncertain, 4=Agree, and 5=Strongly Agree.

The survey was conducted on all one hundred county extension administrators. An initial letter notifying the Extension administrators of the survey was sent by mail one week before the survey was mailed. One week after the initial mailing, the survey was sent to each administrator by email with instructions. After the first week fifteen surveys were received. After this a reminder email was sent, which resulted in eighteen more surveys being received. After the first two mailings had been accomplished, a full survey packet was mailed to all non-respondents through traditional mail, which resulted in seven more surveys. Finally, follow-up phone calls were made to all non-respondents in order to yield a maximum return rate; six more surveys were received from this round. The final response rate was 46% (N = 46).

In order to control for non-response error, Miller and Smith (1983) recommended comparing early to late respondents. Upon completion of the study, an evaluation of the data showed that there were no significant differences found among the early respondents (respondents during the first round) and the late respondents (respondents after the first round).

Findings

North Carolina Cooperative Extension Directors were asked to provide their views of the impact of selected socio-demographics characteristics in relation to the digital divide. Table 1 displays the mean, standard deviation, and means rank for socio-demographic questions used for this study. For the purpose of data analysis, readers should utilize the following specifications when interpreting the scale for tables one and two: 1.00–1.49= Strongly Disagree, 1.50–2.49= Disagree, 2.50-3.49=Undecided, 3.50–4.49=Agree and 4.50–5.00=Strongly Agree.

In relation to, the aforementioned characteristics respondents agreed that younger Americans were more likely to use the Internet compared to older Americans. In relation to an individual’s educational level and their usage of the Internet, Cooperative Extension County Directors agreed an individual with higher educational attainment were more

likely to have access to the Internet compared to lower educational levels. In terms of income, respondents agreed that households with higher incomes were more likely to have access to technologies such as the Internet compared to the lower income households. Respondents were in agreement that those who were not fortunate enough to afford the Internet are left out from the services the Internet can provide as far as advancing their current status by searching for new employment, taking courses or conducting research for school. Cooperative Extension County Directors agreed that the gap between rural households and households nationwide had narrowed over the past two years. On the subject of the digital divide becoming less significant, respondents agreed that more information is becoming electronically based and the poor are missing a significant amount of information; therefore, causing the digital divide to become more pronounced.

Respondents were undecided on minorities having less access to technology compared to the majority population. In terms of giving their perceptions on those individuals who would gain the most from the usage of having access to the Internet Cooperative Extension County Directors were neutral in their responses. Lastly, in relation to the relationship of individuals with disabilities and their access to the Internet, respondents were undecided.

Table 1. ***Digital Divide Socio-demographics Characteristics*** **(N= 46)**

Socio-demographic Characteristics	N	Mean	SD	Rank
1. Younger Americans are more likely to use the Internet than older Americans overall.	46	4.65	.604	1
2. Individuals of higher educational attainment levels are more likely to have access to the Internet than individuals of lower educational attainment levels.	46	4.04	.788	2
3. Households with incomes of $75,000 and higher are more than twenty times as likely to have access to technologies such as the Internet than those at the lowest income levels.	46	3.82	.716	3
4. The information poor are left out of the opportunity to use the Internet to improve and advance their current status by using it to search for jobs, to take courses, or to do school research.	46	3.61	.881	4
5. The gap between rural households and households nationwide has narrowed over the past two year.	46	3.59	.884	5
6. The digital divide is not becoming less significant but rather more pronounced as the information rich outpace the information poor in gaining access to electronic resources.	46	3.50	.831	6
7. Minorities have less access technology than the	46	3.48	.888	7

majority population.				
8. The people who have the most to gain from using the Internet are the same people who are the least likely to have access to it.	46	3.37	.826	8
9. There is a significant gap between genders in relation to Internet usage.	46	2.54	.912	9
10. Individuals with disabilities are less likely to access to technology than those without a disability.	46	2.83	.851	10

Scale: 1=Strongly Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly Agree.

Respondents were asked to provide their general perceptions of the North Carolina Cooperative Extension Service's role in bridging the digital divide (Table 2). In general, the respondents agreed through various technological applications, extension can provide individuals through digital technology and/or distance education unbiased, research-based information and education. Actually, county directors agreed that farmers can be encouraged to utilized digital technology by way of Cooperative Extension educators.

Cooperative Extension County Directors agreed that Cooperative Extension agents should be knowledgeable of the latest advancements in digital technology. Respondents decided that Cooperative Extension agents should have constant in service training in the latest advancements in digital technology. By way of the 4-H youth development, Cooperative Extension County Directors agreed that youth are able to learn the new advantages in technology. Respondents also agreed that extension service should expand its teaching to fit the needs of in time learning. In terms of programs geared around community resource development, County Directors agreed that they should have a stronger focus in technology. Directors were knowledgeable about how much of an impact Cooperative Extension services could provide to lower income communities and minorities in relation to technology access. County Directors were unsure about creating local partnerships with learning centers, libraries and schools, local extension offices being staffed and equipped to become learning centers with technology, having Cooperative Extension offer alternate means of technology access in rural areas, and the North Carolina Cooperative Service being prepared to assist clientele in bridging the digital divide.

Table 2. ***Extension in the Digital Divide*** **(N=46)**

Extension Variables	N	Mean	SD	Rank
1. Lifelong learning applications using digital technologies and distance education offer limitless possibilities to engage multiple audiences, expanding Extension's educational role as a "brand name" quality source for unbiased, research-based	46	3.93	.654	1

	information and education.				
2.	Cooperative Extension agents can be an effective means of encouraging farmers to adopt digital technology.	46	3.91	.668	2
3.	Cooperative Extension agents should have constant in service training in the latest advancements in digital technology.	46	3.89	.745	3
4.	The 4-H youth development component of the extension service can aid in technology access in order to improve their daily lives.	46	3.75	.686	4
5.	The extension service should expand its learning information system to support just in time learning.	46	3.72	.861	5
6.	Community resource development programs in cooperative extension should have a strong technology focus.	46	3.64	.679	6
7.	Cooperative Extension can aid lower income communities in gaining wider access to technology.	46	3.53	.991	7
8.	Cooperative Extension can aid minority communities in gaining wider access to technology.	46	3.51	.944	8
9.	Partnerships can be established by cooperative extension to manage learning centers in malls, libraries, and schools.	46	3.45	.901	9
10.	Local extension offices should be equipped and staffed to become local centers of learning with technology.	46	3.44	.990	10
11.	Alternative means of technology access for rural areas can be developed by cooperative extension.	46	3.36	.917	11
12.	The North Carolina Cooperative Extension Service is adequately prepared to assist the public in bridging the current digital divide.	46	2.61	.829	12

Scale: 1= Strongly Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly Agree.

Research question three discusses the demographics of the North Carolina Cooperative Extension County Directors. The following demographic variables were discussed within Table 3: age, gender, race or ethnicity, educational background; years of

extension service, years of extension administrator and hours of training in the area of technology within the past 5 years. In regards to age, North Carolina Cooperative Extension County Directors reported a mean age of 49. According to the data, 28 of the County Directors in North Carolina were males whereas only 18 were females. In regards to race or ethnicity, there were 40 Caucasians, 5 African Americans and 1 Native American. Nonetheless, there were no Hispanics or Asian Cooperative Extension County Directors reported.

In relation to education, respondents were asked to provide their highest level of education earned in Table 3. Cooperative Extension County Directors possessed a total of 45 graduate degrees (40 Master's and 5 Doctorate). One County Extension Director held just a Bachelor's degree – apparently no one held any specialist degree.

In relation to the years in extension, collectively the County Directors served 22 mean years in extension. In terms of administration extension experience, respondents reported a mean of 9 years. Respondents indicated that in past 5 years, they have attended an average mean of 25 hours of training in technology.

Table 3. *Demographics* (N=46)

Respondents Demographics	**N**	**Mean/Percentage**	**SD**
1. Age	46	49.54	
2. Gender:			
Male	28	60.9%	
Female	18	39.1%	
3. Race/Ethnicity			
Black	5	10.9%	
White	40	87.0%	
Hispanic	0	0%	
Native American	1	2.2%	
Asian	0	0%	
4. Highest Degree Earned			
Bachelor's	1	2.2%	
Master's	40	87.0%	
Specialist	0	0%	
Doctorate	5	10.9%	
5. Years of Extension Service	46	22.00	7.809
6. Year as an Extension Administrator	46	9.41	7.114
7. Hours of Technology in past 5 years	46	24.98	33.463

Conclusions

It was perceived by survey respondents that younger Americans were more likely to use the Internet than older Americans. According to Elbert & Alston (2005), younger

Americans were likely to utilize the Internet compared to the number Americans over the age of 50. Perhaps this is based upon the fact that today's youth are exposed to digital technology such as the Internet from infancy and therefore, has little to no apprehension with its usage in their daily personal and professional dealings. In addition, Wilson et al (2004) examined adult between the ages of 18-24 and noticed how their level of education played a vital role in preparing them in terms of skills and procedures used in this technological world. "Leveraging the Power of Youth" is a guiding principle of the e-NC Authority, recognizing that young people can be major change agents in moving local communities toward the adoption of computer technology and the Internet (e-NC Authority, 2009).

Respondents on the average indicated no knowledge of a gap in genders in relation to usage of the Internet. This is direct contrast to Shade (2002) who acknowledged that males felt more comfortable with; adaptable to and less anxious with computer technology. In their study it was found that men prefer to use the Internet for information gathering and entertainment, whereas women prefer to use the Internet for interpersonal communication. According to brain based research males tend to be more spatially, mechanically, and mathematically oriented whereas females tend to be more adapt at recognizing emotional overtones in others and in language, emotional and artistic expressiveness, esthetic appreciation, verbal language and carrying out detailed and pre-planned tasks (Blum, 1997, Bishop & Wahlsten, 1997, and 1998).

North Carolina Cooperative Extension County Directors were unaware about the individuals with disabilities and their usage of technology. Salend (2005) indicated that computer technology and the Internet have a tremendous potential to broaden the lives and increase the independence of people with disabilities. Smith (1998) stated that people with disabilities in rural areas now have an extremely powerful and adaptable communication tool that can reduce isolation and provide access to a vast range of services and information. North Carolina Cooperative Extension Personnel, given their mission of providing educational programming to all sectors of the public clientele, may need in-service training on the particular concerns/needs of individuals with disabilities in the respective communities they serve.

North Carolina Cooperative Extension County Director agreed that households with incomes 75,000 and higher were more likely to have access to technology than those with lower incomes. This finding indicates that County Directors in North Carolina recognized that income is major factor in households whom have the Internet compared to those who do not produce the same income. The e-NC Authority (2009) indicated that Internet access has a tremendous effect on every level of the economy promoting positive economic growth and performance in ways that are significant and comprehensive.

In general, North Carolina Cooperative Extension County Director agreed the digital divide is not becoming less significant but rather more pronounced as the information rich outpace the information poor in gaining access to electronic resources. Also, they agreed that information poor are left out of the opportunity to use the Internet to improve and advance their current status by using it to search for jobs, to enroll in

courses, or perform school research. The data indicates that County Directors are knowledgeable about improvements that need to be made to inform the poor about the advantages of using the Internet especially when seeking employment, conducting school research or enrolling in courses. This is supported by the e-NC Authority's principle of Inclusiveness, which indicates that all populations regardless of age or income must have equal access to the opportunities brought about by broadband Internet (e-NC Authority, 2009). North Carolina Cooperative Extension County Directors agreed individual's' of higher educational attainment levels are more likely to have Internet than those with lower education levels. Wilson, Reiser, Potter and Wallin (2004) stated over the period of their study between 1999 and 2004 – an individuals' educational attainment within North Carolina increased in reference to their computer access. This finding indicates that the Cooperative Extension County Directors are aware that education plays a major role in relation to digital technology access and can affect a person's future quality of living.

Respondents agreed that the digital divide gap has narrowed between rural and urban communities. This is supported by findings from the e-NC Authority (2007 & 2009) who indicate that rural regions of the state have made significant progress in relation to their digital access, but gaps still remain in some areas of the state. With regard to race, respondents were undecided about if minorities had less access to technology than the majority population. Whitacre & Mills (2003) indicated that Caucasians had greater access to and usage of the Internet than African Americans. In addition, non-Hispanics showed greater usage of the Internet than Hispanics (Compaine, 2001; National Telecommunications and Information Administration and Economics Statistics Administration [NTIA], 2002). African Americans and Hispanics are less likely to be connected to the internet compared to Caucasian at home (Shade, 2002).

In relation to The North Carolina Cooperative Extension Service's role in bridging the digital divide it was agreed upon by respondents that digital technology should be an integral part of extension's educational programming efforts, extension community resource development programs have strong technology focus, extension programming aid minorities in obtaining digital access, 4-H be utilized as a mechanism of technology dispersion, local partnerships be established by cooperative extension for digital technology promotion, and digital technology access for rural areas be promoted by cooperative extension. In contrast to the aforementioned findings respondents were undecided if the North Carolina Cooperative Extension Service was ready prepared to assist the public in bridging the digital divide. The e-NC Authority (2009) indicated that all educational entities in North Carolina in addition to nonprofits should work to encourage digital literacy.

Recommendations

Based upon the findings of this study the following recommendations are made:

- Cooperative Extension County Directors should establish partnerships with the local community college(s), churches, libraries, high schools, and telecommunication

providers to assist lower income youth and adults in gaining better access to technology – to increase their employment status in both rural and urban areas.

- To narrow the digital divide occurring between younger Americans and older Americans, services need to be developed and geared to teach older Americans about digital technology; which can be facilitated through Cooperative Extension.
- Cooperative extension directors could establish partnerships with telecommunications providers to encourage digital access be made available to underserved communities and populations.

Implications

Shade (2002) indicated that income, education, age, gender, race/ethnicity, and geographic location will continue to be the factors that impact the digital divide. Results from this study can aid county directors in developing policies and educational programming to assist the clients they serve in gaining more access to digital technology; thereby, improving their daily lives.

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An Analysis of the North Carolina Cooperative Extension Service's Role in Bridging the Digital Divide

A Critique by John C. Ricketts, University of Georgia

Reaching and educating everyone is more possible and at the same time more complex than ever before. The traditional goal of going to the rural areas to bring results of research to "end-users" has morphed a bit, but regardless we are still faced with the need and challenge to communicate findings to those relying upon it. The authors do a nice job of explaining that the preferred medium providing for the possibilities and the complexities of accomplishing the original goal of extension is a digital medium. A fascinating description of economic advantage of digital technology is provided in this paper. The advantages were so impressive that I found myself wishing for more details and original citations in the paper's introduction, rather than summary reports.

The paper is written in a way that is easy to understand with a few exceptions. Rogers' Diffusion of Innovations was classically and probably appropriately cited as the theory base for the piece, but this paper caused me to wonder if perhaps it is missing a key function. Where does "access" fit into Rogers' theory? I believe that perhaps this paper missed an opportunity to suggest that "access" is a function that ought to be added to diffusion of innovations.

This descriptive study was almost textbook in terms of methods with the exception of non-response and how it was handled. The authors are to be commended for making an appropriate number of contacts and for comparing early to late respondents. What are some ways to increase response rate – especially among administrators? Were there some "opinion leaders" among this group that could have helped garner more response? Also, what were the specific methods for comparing early and late respondents? How do others go about dividing these two groups?

The authors are to be commended for bringing the digital divide to light. In general, directors agreed that younger, more educated, and more wealthy individuals had more access. They also agreed that digital technology was important for extension, that agents can encourage farmers to use the technology, and that agent training is of utmost importance, but the directors were unsure about establishing partnerships with the community (libraries, learning centers in malls, etc…) and they were unsure about providing alternative means of technology access. Access seems to be the biggest problem, and it seems to be a problem that the extension directors were least concerned about. The authors are to be commended for recognizing this as a key finding and reporting in their recommendations that access had to be addressed.

An Evaluation of Successful Collaboration Among Agricultural Science Teachers and Extension Agents in Texas

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Abstract

The purpose of this research was to investigate collaboration between agricultural science teachers and Extension agents in Texas – from the perspective of successful collaboration. Programs, leaders, and participants in both agricultural education and Extension can be impacted positively through collaboration. However, successful collaboration ultimately rests upon the commitment of individuals and the willingness for these individuals to work together and "collaborate" with one another. This study examined factors indicated in the literature as enablers of collaboration in the context of collaboration among agricultural science teachers and Extension agents in an effort to document best practices. Specific objectives included: 1.) documentation of the environment in which successful collaboration is taking place, 2.) description of areas of collaboration, 3.) description of the impact of Internet-based technologies, and 4.) identification of the major factors influencing collaboration. Findings provided insight into factors that can facilitate collaboration.

Introduction

The goal of this research was to investigate collaboration among agricultural science teachers and Extension agents in Texas – from the perspective of successful collaboration. Why are some agents and teachers able to collaborate effectively? Are there characteristics of the individuals or the settings that can help or hinder cooperation between these two groups? This multi-phase study was conducted to document promising practices that encourage collaboration among Extension agents and agricultural science teachers in Texas.

The desire to encourage collaboration among Extension agents and agricultural education teachers has been documented as being important. Graham (1994) stated, "I am not advocating joining clubs at the school or community level, but rather a joining of resources for the elimination of unnecessary competition" (p.9). Gamon (1995) stated, "A willingness to network and collaborate with Extension educators will return very positive dividends for agricultural education teachers" (p. 20). In a study conducted by Ricketts & Place (2005), it was found that interdisciplinary cooperation was perceived as important by both Extension agents and agricultural education teachers. The need to encourage collaboration is especially critical at a time when budgets and time are short – and need for programming is high. Ultimately, the implementation of collaboration efforts rests on the willingness of the individual.

Theoretical Framework

Defining Collaboration

The terms cooperation, coordination, and collaboration are often used interchangeably. Mattessich and Monsey (1992) defined these three terms on a continuum of durability. Cooperation was described as informal without structure, while coordination was defined as more formal relationships, and collaboration suggested "a more durable and pervasive relationship" (p. 39). When looking specifically at collaboration, it is important to note that various authors have defined collaboration in different ways. Mattessich and Monsey (1992) defined collaboration as "a mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals" (p. 7). Wood and Gray (1991) shared that in the process of seeking a definition of collaboration, the authors found a "welter of definitions" (p. 144). These authors defined collaboration as, "… when a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain" (p. 145). For the purpose of this study, collaboration was defined as agricultural science teachers and Extension agents engaging in sustained cooperation and group effort over time, with a common purpose for the benefit of both agencies, key stakeholders, and the community.

Importance of Collaboration

The importance of collaboration within agriculture has been studied in different contexts. Dormody (1992) explored the concept of "resource sharing," an element of collaboration, between secondary agricultural science teachers and their respective science departments. This study found that agricultural science teachers did in fact share resources with their respective science departments; however, the amount of sharing could be improved. The study also indicated the importance of improved communication and awareness as factors that impact the sharing of resources. Osborne and Dyer (1998) looked at attitudes of high school science teachers toward agricultural science programs and found that "one-half of the science teachers reported some collaboration with agricultural teachers" (p. 8). "These attitudes also influence their tendencies to collaborate with agriculture teachers in offering new agriscience courses" (Osborne & Dyer, 1998, p. 9). Whent (1994) built upon the concept of studying factors that influence the sharing of resources by measuring the impact of participation in an "Agriscience Institute and Outreach Program." Whent found that participation in the program had indeed increased the sharing of resources between departments.

The concept of collaboration among Extension agents and agricultural science teachers is not new. Diatta and Luft (1985) conducted a study to determine the level of cooperation between vocational agriculture teachers and county agents in North Dakota. The authors specifically looked at the influence of sixteen factors on cooperation. These factors included: short distance between school and office, initiative in making contact, informal relationships, clients being served, age similarity, discussing factors affecting educational programs, recognition of credit, tenure in position, formal education, client

recognition, relationship between school and extension office, years of experience, difference of age, time conflicts, lack of clarity, and long distance between school and office. Of these factors, only four had a neutral or negative impact on cooperation: "difference in age, long distance (greater than 20 miles) between school and county extension office, time conflicts in getting together for cooperative efforts, and lack of clarity of functions" (p. 9). Hillison (1996) stated: "Today's agricultural educator and cooperative extension leader need to look at the historical memoranda of understanding to find precedent-setting points of agreement and points of controversy in order to best facilitate collaboration" (p. 9).

Lacy (1996) addressed collaboration in a broad sense when he stated the importance of collaboration across research, extension, and user partnerships. While collaboration among agricultural science teachers and Extension agents are merely one small part of the collaboration described, it is important to recognize the significance of collaboration. Lacy stated, "Finally, agendas of the research/extension/user system will need to arise out of negotiation, persuasion, and coercion involving the full range of clients, extension educators, and researchers, if it is to more effectively meet the future needs of our food system both domestically and globally" (p. 40). While this statement is beyond the scope of this study, it is important to recognize that collaboration ultimately takes place at the individual level and that all collaboration efforts will contribute to the goal stated by Lacy.

Factors Impacting Collaboration

Deutsch (1949) explored the concept of cooperation and competition in his article entitled "A Theory of Co-Operation and Competition." Given that agricultural Extension and agricultural education are seen as both competitors and colleagues, it is important to consider these elements in the context of improving collaboration. Deutsch indentified the following group aspects as ones that need to be considered: "organization, motivation, communication, orientation, productivity, interpersonal relations, and individual behavior" (p. 141). The author shared that each of these aspects can impact how groups function.

Grage, Ricketts, and Place (2002) conducted a qualitative study to explore "cooperation and collaboration perceptions among agricultural educators and Extension faculty" (n. p.). This study revealed that relationships, awareness, understandings, and perceptions were critical in the positive influence of cooperation. The study further revealed a "lack of strong collaboration between the disciplines" (p. 1). An awareness of job function was revealed as one factor that impacted the success of collaboration. In 1985, Diatta & Luft reported that agricultural science teachers and Extension agents "need to be made more aware of the functions of each other's job" (p.12).

Mattessich and Monsey (1992) conducted an extensive review of literature focused on factors that influence successful collaboration. One of the goals of the report generated was to "review and summarize the existing research literature on factors which influence the success of collaboration" (p.2). This report provided a strong theoretical

base for understanding collaboration and the factors that can impact the success of collaboration. Mattessich and Monsey (1992) identified 19 factors that can influence collaboration and grouped the factors into six categories: environment, membership characteristics, process/structure, communication, purpose, and resources. The environmental factor related to cooperation in the community from the perspective of political climate and overall history within the community. Membership characteristics related to "mutual respect, understanding, & trust" (p. 12), representation by all community segments, self-interest, and the "ability to compromise" (p.12). Process/Structure related to the feeling of "ownership" of both the process and the results, looking at how open and flexible members are. Communication related to frequency and openness in both informal and formal channels. Purpose related to the extent to which there are shared goals and vision that yield a unique purpose. Resources related to both financial and human resources.

The study conducted by Grage, Place, and Ricketts (2004) confirmed many of these factors as being important in encouraging collaboration. The authors reported "a good working relationship," "mutual respect," "essential communication," "history of cooperation," "former relationships," "awareness of the other profession," and "understanding of cooperation and competition" as impacting cooperation (n. p). The authors recommended activities such as joint preparation activities and educational activities for agents and teachers to learn about each other's professions. Additionally, the authors stated that "future research should continue to focus on the perceptions, attitudes, and motivations behind both groups as it pertains to developing cooperative relationships" (n. p.).

When considering the concept of collaboration, it is important to recognize the role that the organization plays in facilitating or hindering collaboration at the individual level. van de Ven (1976) provided a theoretical foundation for studying "inter-organizational relationships" (p. 25). He shared that similarity in goals, where finances are obtained, professional skills of members, services, and customers will impact the extent to which agencies will take part in inter-organizational relationships. This concept ties directly to the concept of collaboration. Successful collaboration ultimately rests upon the commitment of individuals and the willingness for these individuals to work together and "collaborate" with one another.

Purpose and Objectives

The purpose of this study was to examine factors of collaboration between agricultural science teachers and Extension agents. Successful collaboration was defined as sustained cooperation and group effort over time, with a common purpose for the benefit of both agencies, key stakeholders, and the community as perceived by state leaders in both Texas Extension and the Texas Agriculture Teachers' Association. This study had the support of these leaders. Specific objectives included:

1.) Document the environment in which successful collaboration is taking place.
2.) Describe areas of collaboration.
3.) Describe the impact of Internet-based technologies.

4.) Identify the major factors influencing collaboration.

Methods / Procedures

Population and Sample

Participants were purposefully selected through a nomination process. Leaders in Texas Extension and the Texas Agriculture Teachers' Association were asked to identify teachers and agents who collaborate well with their counterparts. The purposive sampling method was also utilized because there are approximately 1600 agricultural education teachers (Directory of Texas Agricultural Science and Technology Teachers) and approximately 600 Extension agents (Texas AgriLife Extension Service, 2009) across the state of Texas. A first round list of potential participants was generated based on those responses. Potential participants were then asked to confirm that they collaborate well with their teacher/agent counterpart and provide names of counterparts they collaborate with. Names not already on the list were added. State agricultural education and extension leaders nominated a total 45 individuals (21 agents; 24 teachers) as collaborating well with their counterparts. An additional 12 individuals (3 agents; 9 teachers) were identified by the participants in the study, creating a sample of 57 individuals (24 agents; 33 teachers). A total of 33 respondents (15 agents; 18 teachers) completed the online survey, yielding a response rate of 58%. Early and late responders were compared as suggested by Miller & Smith (1983) and no statistically significant differences were found.

Instrumentation

The instrument consisted of an online survey that was created by the researchers based on the literature and input from experts in Extension and Agricultural Education. The survey included the following categories: background/demographics, collaboration description, number of years of collaboration, areas of collaboration, use of Internet-based technologies to collaborate, identification of factors that had influenced collaboration, and open-ended questions. Responses to open-ended questions are not reported in this paper. The instrument was analyzed by university faculty, state agricultural education leaders and state Extension leaders for content validity. After minor revision, a pilot test was conducted with a group of agricultural education teachers and Extension agents who were not selected to participate in the study. Instrument reliability was determined to be $\alpha = .87$.

Procedures

The study reported here shares one part of a two-part study focused on collaboration between Extension Agents and Agricultural Education teachers. The two parts included a survey with closed questions and open-ended questions and a follow-up focus group session. Responses to the open-ended questions and focus group are not reported in this paper. Participants that elected to participate in this study were asked to: 1.) Identify agents/teachers that they collaborate effectively with in their county; and 2.)

Complete a brief online survey that included questions related to demographics and collaboration. Responses were coded to ensure confidentiality using a coding system to track data collected from each participant. Institutional Review Board approval was received and assigned protocol number 2009-0450. Data were collected and e-mail reminders were sent to participants to encourage their participation in the study following Dillman's Tailored Design Method (2000). Data were entered into SPSS 17.0 and analyzed according to Gall, Gall, and Borg (2003).

Results/Findings

Description of the Environment of Successful Collaboration

The demographic portion of the instrument revealed that 84% of the participants were male and nearly 67% were between the ages of 31-50. Sixty-nine percent reported being employed in their current position more than 6 years. In fact, 48 percent reported being employed in their current position more than 10 years. Almost half (48.5%) reported working in a town of 5000 people or less and the majority (75.8%) reported that their program has between 101-500 participants. Seventy-eight percent of the subjects categorized themselves as working in a rural setting and 72% reported collaborating with their Extension or agricultural education counterpart for more than five years. In comparing agents to teachers, both groups were represented by similar numbers based on gender, age, years in position, location, and years of collaboration. More teachers (72 %) than agents (20%) reported working in a community of 5000 people or less. In fact, 73% of agents reported working in communities larger than 10,000 people. Twenty-six percent of agents and no teachers reported working with over 500 students. Table 1 shares detailed demographic information.

Table 1

Agricultural Education Teachers' and Extension Agents' Demographic Information

Demographic Characteristic	Agricultural Education Teachers n=18		Extension Agents n=15		Cumulative N=33	
	f	Percent	*f*	Percent	*f*	Percent
Gender						
Male	15	83.3	13	86.7	28	84.8
Female	3	16.7	2	13.3	5	15.2
Age						
21-30 years old	3	1.7	2	13.3	5	15.2
31-40 years old	7	38.9	6	40.0	13	39.4
41-50 years old	5	27.8	4	26.7	9	27.3
51 years old and over	3	16.7	3	20.0	6	18.2
Number of years in position						
Less than 1 year	0	0.0	0	0.0	0	0.0
1-5 years	5	27.8	5	33.3	10	30.3

6-10 years	3	16.7	4	26.7	7	21.2
More than 10 years	10	55.5	6	40.0	16	48.5
Size of Community						
5000 people or less	13	72.2	3	20.0	16	48.5
5001-10,000 people	2	11.1	1	6.7	3	9.1
10,001-20,000 people	1	5.5	3	20.0	4	12.1
20,0001-50,000 people	2	11.1	4	26.7	6	18.2
Greater than 50,000 people	0	0.0	4	26.7	4	12.1
Number of Students/Participants in program						
0-100	3	16.7	1	6.7	4	12.1
101-500	15	83.3	10	66.7	25	75.8
501-800	0	0.0	2	13.3	2	6.1
801-1000	0	0.0	0	0.0	0	0.0
Over 1000	0	0.0	2	13.3	2	6.1
Rural or Urban Location						
Rural	16	88.9	10	66.7	26	78.8
Urban	2	11.1	5	33.3	7	21.2
Years of Collaboration						
Less than 1 year	0	0.0	1	6.7	1	3.0
More than 1, less than 5 years	4	22.2	4	26.7	8	24.2
More than 5, less than 8 years	2	11.1	1	6.7	3	9.1
More than 8 years	12	66.7	9	60.0	21	63.6

Areas of Collaboration

Participants were asked which areas they collaborated in: livestock shows/fairs, equipment/facility sharing, guest speaker/content area expert, volunteer and/or other. Table 2 reveals the percentage of participants, as reported by both teachers and agents, who collaborate in these areas. Almost all (97%) of the respondents indicated that they collaborated in livestock shows/fairs and a majority (66%) of the respondents indicated collaboration in regard to equipment/facility sharing. A comparison between teachers and agents revealed that both groups collaborated equally on all areas listed with teachers (61%) indicating slightly more collaboration in regard to guest speaker/content area expertise than agents (46%). A total of 7 respondents indicated collaboration in "other" areas yielding 5 additional areas of collaboration.

Table 2

Agricultural Education Teachers' and Extension Agents' Reporting of Areas of Collaboration

Which of the following areas do you collaborate in?	Agricultural Education Teachers	Extension Agents	Cumulative

	n=18		n=15		N=33	
	*f**	Percent	*f**	Percent	*f**	Percent
Livestock shows/fairs	18	100	14	93.3	32	97.0
Equipment/facility sharing	10	55.6	12	80.0	22	66.7
Guest speaker/content area expert	11	61.1	7	46.7	18	54.5
Volunteer	13	72.2	13	86.7	26	78.8
Other**	3	16.7	4	26.7	7	21.2

**Frequency of reporting of "Yes"*
**Other included: "Judging Teams," "Leadership," "Show Validations," "4-H," "Committee."

Impact of Internet-based Technologies

Participants were asked if Internet-based technologies had impacted their collaboration efforts specifically in regard to Internet Access, E-mail, Social Networks, Blogs, and/or Twitter™. Tables 3 and 4 reveal the numbers and percentages of teachers and agents, respectively, who reported Internet-based technology impact on collaboration efforts. All teachers indicated that Internet (in the broad sense) and email had impacted their collaboration efforts. Seventy-three percent of agents indicated impact by the Internet and 86% indicated impact by email. Blogs and Twitter™ were reported as not having an impact of collaboration. Only one teacher indicated that Twitter™ had some impact on his/her collaboration efforts. Social networks were similarly indicated as having low impact. Sixteen percent of the teachers and 13% of the agents reported some level of impact.

Table 3

Agricultural Education Teachers' Reporting of Internet-based Technologies Impact on Collaboration Efforts (n = 18)

	Agricultural Education Teachers n=18					
	No		*Yes – Some*		*Yes – A Lot*	
	f	Percent	*f*	Percent	*f*	Percent
Internet Access (in the broad sense)	0	0	13	72	5	27.8
E-mail	0	0	4	22.2	14	77.8
Social Networks (i.e., Facebook™, MySpace™)	14	77.8	1	5.6	2	11.1
Blogs	16	88.9	0	0	0	0
Twitter™	16	88.9	1	5.6	0	0

Table 4

Extension Agents' Reporting of Internet-based Technologies Impact on Collaboration Efforts (n = 15)

	Extension Agents n=15					
	No		*Yes – Some*		*Yes – A Lot*	
	f	Percent	*f*	Percent	*f*	Percent
Internet Access (in the broad sense)	4	26.7	10	66.7	1	6.7
E-mail	2	13.3	8	53.3	5	33.3
Social Networks (i.e., Facebook™, MySpace™)	11	73.3	2	13.3	0	0
Blogs	12	80.0	0	0	0	0
Twitter™	13	86.7	0	0	0	0

Major Factors Influencing Collaboration

Participants were asked to identify whether or not the elements of necessity, convenience, incentives, relationships, and/or knowledge sharing, had influenced them to collaborate. Table 5 reveals the results of both teachers' and agents' responses. Relationships and knowledge sharing were reported by 88% of teachers and over 80% of agents as influencing collaboration. Necessity and convenience were reported by 61% of teachers and over 66% of agents as influencing their collaboration efforts. Only a limited number of respondents (11% of teachers and 33% of agents) reported incentives as an influence.

Table 5

Agricultural Education Teachers' and Extension Agents' Reporting of Elements that have Influenced Collaboration (N = 33)

What has influenced you to collaborate?	Agricultural Education Teachers n=18		Extension Agents n=15		Cumulative N=33	
	*f**	Percent	*f**	Percent	*f**	Percent
Necessity	11	61.1	11	73.3	22	66.7
Convenience	11	61.1	10	66.7	21	63.6
Incentives	2	11.1	5	33.3	7	21.2
Relationships	16	88.9	13	86.7	29	87.9
Knowledge Sharing	16	88.9	12	80.0	28	84.8

**Frequency of reporting of "Yes"*

Conclusions

Based on the findings, there are many conclusions that can be drawn related to the environment for successful collaboration, areas of collaboration, impact of Internet-based technologies on collaboration, and factors that can influence collaboration.

Description of the Environment of Successful Collaboration

Based on the demographics collected from respondents, it can be concluded that teachers and agents who are identified as successful at collaboration are generally male, thirty-one years of age or older, and have been in their position for more than ten years.

In terms of demographic characteristics, similarities and differences between agents and teachers were found in several areas. One area that teachers and agents shared no difference in related to gender. Participants in this study were overwhelming male regardless of position as agent or teacher. Statewide data shows that both groups are predominantly male, with overall numbers typically in the range of 60-70% by profession. This study includes 83-86% males. The researchers are perplexed by this finding which warrants further investigation. Perhaps it is simply a result of the nomination process that was utilized in this particular study.

In the area of number of years in position, the majority of teachers had been in their position for more than ten years while agents were more evenly split between 1-10 years and over ten years. This correlates to the "years of collaboration" reported where the majority of both groups reported collaborating more than 8 years. Additional research should be conducted to determine if years in position contributes positively to collaboration.

Size of community showed differences between agents and teachers. Agricultural Education teachers overwhelming reported working in communities of 5000 people or less (72.2%) while agents were more evenly split across categories, with the majority (53.4%) working in communities greater than 20,000. While defining the term "community" may be easier for a teacher because of the location of the school, the researchers questioned if agents are typically located in places of larger populations in order to serve the greatest number of people or if it is a function of where agents feel they contribute the most. The researchers believe it is important to study further the rural and urban implications on collaboration efforts

Another interesting finding related to the self-identification of where teachers and agents worked: rural versus urban locations. Though the majority of agents reported working in communities of greater than 20,000 people, the majority also reported working in rural areas. The disconnect revealed in these responses warrants further investigation.

Based on the finding that "time" was listed as the most prominent barrier to collaboration, it can be concluded that successful collaboration requires individuals to see collaboration as a benefit rather than just an additional task. This finding matches with

the findings of Diatta and Luft (1985), revealing that "time" continues to be a pressing issue.

Areas of Collaboration

It was not surprising that the majority of agents and teachers collaborate in the area of livestock shows and fairs. This finding lends further support to the findings by Grage, Place and Ricketts (2004) who reported that much cooperation between agents and teachers took place in this arena. This happens to be a setting where agents and teachers interact with students, parents and projects simultaneously and lends itself to collaboration rather than a duplication of effort. However, it was surprising that only 55.6% of teachers reported collaborating on equipment and facility sharing. It was also surprising that only 54.5% of teachers and agents reported collaborating in the area of guest speakers/content area experts. Based on the findings, it can be concluded that livestock shows and fairs are a prominent area of collaboration. Future research should seek to determine methods to increase collaboration efforts in these areas.

Impact of Internet-based Technologies

In reviewing the data related to the impact of Internet-based technologies on collaboration, surprising differences were found in comparing agents and teachers. While all teachers reported using the Internet and email (yes-some or yes-a lot), 26.7% of agents reported not using the Internet and 13.3% reported no use of email for collaboration. The question arises as to why these individuals would not be using the Internet or email for collaboration. Is it possible that the lack of use by agents is a function of lack of quality equipment and/or slow Internet speeds? In addition, findings reveal that social networks, blogs, and Twitter™ are not currently being used to facilitate collaboration. Based on the findings, it can be concluded that Internet-based technologies are not currently impacting collaboration, except for the use of email by teachers.

Major Factors Influencing Collaboration

When asked the question, "What has influenced you to collaborate?", it was noteworthy that only a few (21.2%) of the respondents indicated that incentives had influenced their collaboration efforts. It can be concluded that incentives are not a primary influence on collaboration. Based on the finding that the prominent influences on collaboration efforts were "relationships" and "knowledge sharing," it can be concluded that interpersonal relations and individual behavior (as noted in the literature) are critical factors in the collaboration between teachers and agents.

Limitation of the Study

Given that participants were not randomly selected, a limitation of the study exists because leaders in Texas AgriLife Extension and the Texas Agriculture Teachers' Association identified potential respondents, thus, those agents or teachers that are

collaborating in ways not seen by leadership were not provided an opportunity to respond.

Implications & Recommendations

How do we foster collaboration between Extension agents and agricultural education teachers? Can we utilize the individuals who have been identified as successful collaborators and have them serve as mentors to beginning agents and teachers? The researchers believe it may be possible for expert collaborators to present workshops at new agent training programs and at the Texas agricultural education teacher conferences to emphasize both the importance and advantages of collaborating. Current practices in preparing teachers and agents should also be examined to determine pre-service activities that could positively impact collaboration.

Based on the conclusion that Internet-based technologies are not currently impacting collaboration (except for the use of email by teachers), an implication exists that relates to possible training or exposure as to how Internet-based tools can be used to enhance collaboration efforts. In addition, this study reveals possible issues with equipment and Internet speed for both teachers and agents. Current news media sings the praises of how social media and Internet technologies can encourage collaboration; however, this study does not support that viewpoint.
Further investigation is needed to determine if the lack of use of Internet-based technologies is by choice or a function of poor equipment and/or access.

Does collaboration benefit both Extension agents and agricultural education teachers equally, or is there more benefit for one group over the other to collaborate? The concept of reciprocity and equal benefit should be considered in future research.

It is not known as to whether being in a rural versus an urban setting influences collaboration. Seventy-eight percent of the respondents indicated that they were in a rural setting. Does this mean that there is more opportunity for collaboration in rural areas? Or, is it possible that leaders see collaboration more visibly in rural areas? Or, is there merely a greater need for collaboration in rural areas? More research is needed to understand how setting impacts collaboration between the two groups studied.

Based on the conclusion that incentives were not found to be a primary influence on collaboration, future research should investigate the types of incentives that appeal to both groups as well as determine other elements that could positively influence collaboration.

It is important to recognize that this study was conducted at the individual level. A follow-up study is recommended that would look at collaboration as perceived at the administrative level of Extension and Agricultural Education. Additional data regarding the background of agents and teachers that create fertile ground for collaboration would also be helpful.

Finally, the research reported here studied only those individuals that were nominated as individuals who were successful in collaborating with their counterparts in agricultural education or Extension. A study of teachers and agents that self-report not collaborating would be valuable in identifying barriers and incentives to collaboration. A broad-based study of teachers and agents across Texas would also be valuable to collect additional best practices from agents and teachers that might not be in a position to be observed collaborating. The documentation of a list of best practices for collaborative relationships between agricultural education teachers and Extension agents should be generated and shared in order to further enhance collaboration efforts.

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An Evaluation of Successful Collaboration Among Agricultural Science Teachers and Extension Agents in Texas

A Critique by John C. Ricketts, University of Georgia

More research studies in agricultural education should focus on pooling efforts and resources of agricultural and extension educators. As co-pedagogues who are only differentiated by our primary methodology (formal and non-formal education) the divides that often exist between agricultural and extension education are real and unfortunate, but they are also unnecessary. The authors are to be commended for attempting to identify enablers of collaboration. Further, a commendation is in order for defining what is actually meant by collaboration, and for effectively and thoroughly describing the literature related to successful collaboration.

The methods used and findings reported are reflective of competent researchers who understand the right way to conduct social science research. Randomness was not utilized; purposeful selection was, via a form of snowball or chain sampling, to specifically locate the educators who excel at collaboration. This was interesting because in the findings, not even all the "collaborator" participants perceived that they have collaborated as much as they could have.

Methodologically, 58% is not viewed as a great response rate by much of the profession. If procedures were implemented to limit non-response and if randomness was not employed to begin with, how big of a deal is a lower response rate? What could have been done to improve this portion of the study? In purposeful sampling is comparing early to late respondents still necessary? If so, then the authors ought to detail how this comparison was conducted.

I would also be interested in finding out a little bit more about how the instrument was developed. I understand that a pilot was conducted, but from where did the items originate? There seemed to be several different categories in the findings, but only one reliability estimate of .87 was noted. Were constructs the original intent (areas of collaboration, internet-based technologies impact, elements that influenced collaboration), and if so why is reliability not reported for the constructs? More importantly, what specifically does .87 represent?

Again, I'd like to thank the authors for conducting this much needed piece of research. This is a difficult issue, and one that will take a concerted grassroots effort to address.

The Meaning Early Career Agriculture Teachers Ascribe to their Time

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This phenomenological study of early career agriculture teachers sought to determine the meaning early career agriculture teachers ascribe to their time. Seven teachers with a range of experience from mid-first year to beginning of sixth year were chosen. Interviews were used to make meaning of their time. Five themes were found in the information: 1) the day consists of patterns that vary depending upon the time of the year; 2) there is a conscious allocation of work time; 3) the process of managing time adapts and evolves over time; 4) personal and social time for the teacher is woven into or around work; and, 5) tensions exist between how teachers would like to spend their time and how they actually spend their time. Recommendations include taking stock of workload and personal time, identifying times that are most productive and adjusting their schedule to accommodate, developing a rhythm to their work, making decisions about how to spend time and realizing it is an evolving process.

One of the most critical issues in agricultural education is the shortage of highly qualified teachers (Camp, Broyles, & Skelton, 2002; Connors, 1998; Kantrovich, 2007). The argument seems to be that better understanding of the tasks occupying their time could lead to a better understanding of the roles the teacher must fulfill as well as the time consumed by each role, leading to lower stress and higher job satisfaction. Therefore, recent research in agricultural education has focused on the high school classroom teacher and their daily routine, time allocation, job satisfaction, and stress levels (Edwards & Briers, 1999; Myers, Dyer, & Washburn, 2005; Torres, Lambert, & Lawver, 2009). These studies tend to be quantitative in nature and many times call for follow-up studies that could be qualitative in nature to gather more details. Rarely does this follow-up happen.

The National Commission on Teaching and America's Future (1996) stated highly qualified teachers are the most important component of a child's education. However, agricultural education is wrestling with problems as a result of the teacher shortage. Kantrovich (2007) projected a 38 % deficit of qualified agriculture teachers nationwide for the fall 2007 semester, a phenomenon that is not new. In fact, this concern has been expressed in the profession's supply and demand reports spanning over 40 years (Roberts & Dyer, 2004). The variability of the agriculture teacher career description (Greiman, Walker, & Birkenholz, 2005; Mundt & Connors, 1999; Walker, Garton, & Kitchel, 2004) is believed to place additional pressure on new teachers. Researchers found the less attention paid to beginning teachers early in their careers, the less likely they were to return for another year (Greiman et al., 2005). With a high rate of teacher turnover and a number of retirements looming in the immediate future, the profession cannot afford to lose teachers in these early stages (Boone & Boone, 2007; Smith & Ingersoll, 2004).

Literature Review

One of the key factors indicated in the literature that contributes to teacher burnout is stress (Chan, 1998). Teacher stress occurs when teachers have interactions with others or among their daily work environment which they perceive to be emotionally, physically, or psychologically taxing to the extent that teachers lack the personal or physical coping resources, thereby resulting in disruptions of their daily routines (Lazarus & Folkman, 1984). Teachers experience a number of career related stressors including: working with unmotivated students, classroom discipline, workload and time demands, poor working conditions, challenging relationships with colleagues and administrators, among other factors (Kyriacou, 2001).

Kyriacou (2001) stated that workload demands can be a source of teacher stress. Cole (1981) reported average work weeks of between 45 and 65 hours for agricultural education instructors. Nelson and O'Brien (1993) report that "teachers in the United States devote more hours to instruction and supervision of students each week and have longer required workweeks than in any other country, including the nations with six-day weeks, such as Japan and Switzerland" (p. 75). This finding was supported by recent quantitative findings within agricultural education (Torres et al., 2008). Secondary agriculture teachers face even greater job demands than non-career and technical education teacher as they often work well beyond a 40-hour work week to supervise student projects, coach career development teams, evaluate student work and prepare lessons (Croom, 2003; Straquadine, 1990).

The trend of increasing job responsibilities in agricultural education is well documented in the literature (Delnero & Montgomery, 2001). One early observation cited by the National Research Council (1988) was that secondary agriculture teachers spend a great deal of time helping students excel in production-oriented FFA competitive events and award programs and less time on classroom instruction. Trends in recent years show more, not less, has been added to the job responsibilities in agricultural education. Moore and Camp (1979) found that long hours were the primary reason given by teachers for leaving teaching. While most teachers agree that teaching is rewarding, it is a difficult career because of the lack of resources, too much paperwork, crowded classrooms, students with emotional problems, low salary, and the pressure of high-stakes standardized testing (Strauss, 2007). Peiter, Terry, and Cartmell (2003) found that many first-year agricultural educators experience problems during their first year of teaching. Research by Torres et al. (2008) indicated that the hours a teacher spent at work was the greatest predictor of high teacher stress. This same study showed that teachers with less experience were spending more hours at work and experiencing high levels of stress. Thus, theoretically, this study was framed particularly around the external sources of teacher stress and micro and macro level factors influencing stress which could ultimately lead to teacher burnout.

Theoretical Framework

The theoretical framework for this study was a theoretical-empirical model of teacher stress developed by Montgomery and Rupp (2005) in a meta-analysis of 65 studies on the causes and effects of teacher stress, and adapted for the purposes of this particular study. In this model, the teacher experiences stress through a series of external events. They develop either positive or negative coping mechanisms, elicit an emotional response to the stressors and then depending on their coping abilities, burn out of the profession as a result (see Figure 1). In this model, the environment in which the teacher works, levels of personal support, and personality factors all serve as macro-level constructs that shape the ways in which teachers will react to external stressors. At the heart of the model, external factors such as student behavior, the structure of the school, workload, colleagues, administration, and personal life all serve as potential sources of teacher stress. In this particular study, given that teacher stress is linked to disruptions on the daily routine which can ultimately lead to burnout depending upon individual coping strategies, the ways in which teachers spend their time and the particular external stressors that can detract from that time or daily routine were of focus in the study.

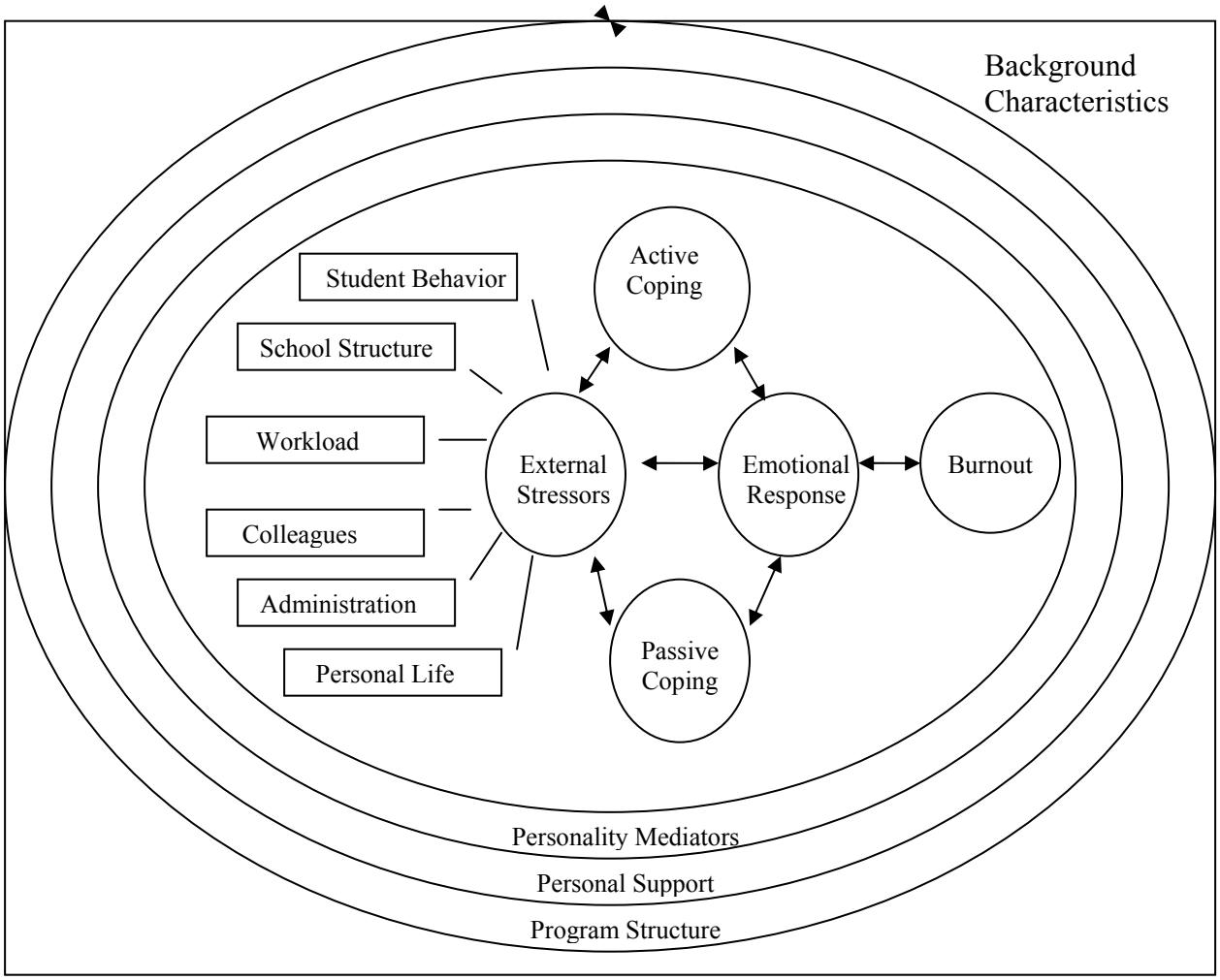

Figure 1. Theoretical-empirical model of construct relationships of teacher stress. Adapted from Montgomery & Rupp (2005)

Quantitative data has been collected on agriculture teachers that would reflect how they perceive spending their time. Torres, Ulmer, and Aschenbrener (2007) conducted a study using document analysis on a weekly journal where agriculture teachers self-reported using 13 pre-defined categories of time usage. The study included student teachers, new teachers (first year) and experienced teachers (more than 3 years). Such approaches generate interesting questions to consider from a research methodology standpoint. Would the results of this study be different if the teachers were not self-reporting their time allocation? Would the results be different if the teachers' time did not have to fit into one of these pre-determined categories? This study is different from the current literature base on agriculture teachers because it attempts to quantify their daily activities not through an instrument or through self-reporting, but from the viewpoint of gaining a deeper understanding of the meaning early career agriculture teachers ascribe to their time, and how external stressors impact their time. This is critical for understanding the workload of early career teachers. We know that large investments of time lead to stress at work, which could ultimately lead to burnout.

Purpose and Objectives

The purpose of this phenomenological study was to investigate the meaning early career agriculture teachers ascribe to their time. Early career agriculture teacher was defined as a full-time employee in high school agricultural education with less than six years of experience on the job. The objectives were: (1) How does an early career teacher spend their time; (2) What statements characterize the phenomenon of time for early career teachers; and, (3) What is the intersection of stress and time for early career teachers of agriculture?

Methods and Procedures

This was a phenomenological study. Phenomenology is a qualitative research method used to describe "the meaning of the lived experiences for several individuals about a concept or the phenomenon" (Creswell, 1998, p. 51).

Participants

The size of qualitative studies are usually quite small, averaging between one and 20 participants (Creswell, 1998). Using criterion sampling, seven different early career teachers were selected as the focus of the study. Criterion-based selection techniques, in particular, involves determining participants based on the goal of the study and consequently, works well with phenomenological studies (Creswell, 1998). The participants were selected because they each met the selection criteria as teachers with less than six years of experience at the secondary agriculture level. This criterion was chosen because five years is the time in Missouri when a teacher can first attain tenure in the profession. Qualitative researchers make use of non-probabilistic sampling

procedures to focus the study from its inception, identifying cases demonstrating the specific characteristics of interest (Patton, 2002). Permission was granted through the individual and the Institutional Review Board.

Procedures

Data were collected through semi-structured interviews. Questions were planned ahead of time based on the central questions being investigated and aimed to capture the typical school day, weekends, summer, vacations, and social time as well as planning, departmental workload balance, and how teachers describe their own time. Specific questions were also asked to understand how the organization impacted their time. The interviews lasted approximately 40 minutes per teacher.

Bracketing

Objectivity and confirmability were established by attempting to bracket the experiences of the researchers. The researchers are all former high school teachers and are all presently involved in teacher education. These experiences influenced how they observe, interact with, and receive responses from an agriculture teacher, but every attempt was made to minimize this influence by triangulating data and being aware of these possible influences.

Data Analysis

The coding process began with a review and re-read of all collected data. The next step was an attempt at open coding where each transcript was reviewed for possible themes or connections to the phenomenon of interest. Those themes were compiled and analyzed for overlapping information. At this point, themes were combined, creating five over-arching themes of teachers and their time. Quotes were selected which supported each theme.

Trustworthiness

Qualitative researchers use measures of validation formed from the credibility, transferability, dependability, and confirmability achieved through the methods (Lincoln & Guba, 1985). Credibility relates to the level of confidence in the researcher design and findings, to accurately represent and interpret the data (Ary, Jacobs, Razavieh, & Sorensen, 2006).

Triangulation is an option making use of various sources, methods, investigators, and theories in the hope of providing evidence to back up emerging themes as well as identifying any inconsistencies in the data (Creswell, 1998). Credibility of the data was established through the use of a semi-structured interview protocol and by choosing an interviewer with as little personal connection to the subjects as possible. Following the interviews, the primary data were transcribed from the digital audio recordings (Kvale, 1996). According to Kvale, transcripts are translations of the lived interview experience into the text format and are interpreted differently as a result. Therefore, transcripts were submitted to participants to allow them to check for the accuracy of statements. Member checks were also performed on the themes that were seen in the data to confirm.

Participants

Seven teachers participated in the study. The first was in the spring of her first year of teaching. She was a single, traditionally trained teacher in a two-teacher department at a large, comprehensive high school in North Carolina. The next teacher was a single, traditionally-trained teacher in August of her second year as a teacher at a career center for a large, urban/suburban area of Missouri. She was in a multi-teacher department. The third teacher in the study was beginning his third year teaching in a two-teacher department in Missouri. He was traditionally certified in a teacher education program. The fourth subject was a married male teacher in his third year teaching in a single-teacher department. There were approximately 250 students enrolled in this comprehensive high school in this small Missouri community. He represented the traditional view of the "high-achieving" agriculture teacher. He admitted to working 12 hour days, 6 days a week. The next participant was a fourth year teacher at a rural town in southern Missouri. She worked in a two teacher department in a high school where enrollment was about 400 students. She was a parent of a young child and said she found her time outside of the classroom at a premium. She faced family responsibilities that required her to modify program management strategies to be successful. She trained CDE teams during school in the spring because she didn't have time for practices after school. The sixth teacher in this study was in the middle of his fifth year in a two teacher, comprehensive agriculture program in North Carolina. He was traditionally certified and defined himself by the successes of his students. He was in a recently committed relationship. The last teacher in the study was just beginning her sixth year as a teacher in a rural Missouri school district. She was an agriculture student in high school and was working in a multi-teacher program with a lateral entry teacher. She indicated that she prided herself on students' successes in FFA leadership CDE events. She was also a young parent and struggling with balancing family roles with her career.

Limitations of the study

While qualitative research by purpose and design focuses on a smaller number of participants in greater depth, it is important to note that this study is limited in scope. While potentially transferable to other settings, the findings from this study are limited to the context of the seven individuals across two states who participated. Qualitative research is not intended to be generalized, and the findings should not be interpreted beyond the scope of the participants in this study.

Findings / Results

The first objective was to characterize how an early career teacher spends their time. For this objective, the theme of patterns emerged.

The day consists of patterns that vary depending upon the time of the year

From both the early observations as well as the interviews it became apparent that there were consistent patterns to not only the way the teacher operated within the scheduled class period, but also to how they moved through the day (see Table 1). Further investigation showed that teachers had a pattern in mind for the way the year

would operate and could talk about what they would be doing months ahead. When asked to talk about a typical day, teachers could describe a pattern they see on a daily basis.

The pattern these early career agriculture teachers find in their time seems to vary depending upon whether the teacher is in an academic year, summer, or school breaks. It also seems to vary depending upon what FFA events are occurring. When asked about the hours per week the teachers worked, it was difficult to get a response. This time was dependent upon the non-instructional time events of the day. Many teachers seemed to break the year down by which CDE was occupying the time outside of school. When questioned about summer, there seemed to be an understood pattern because the teachers began listing events and time frames without pausing or checking a date book.

Table 1 - *Sub-themes seen within the teachers' patterns*

Pattern sub-themes	**Quotations from Participants**
Pattern to Class Period	"Typically start the day out with…a journal everyday… announcements everyday about what's going on…. I review a little bit or quiz …then move on to new stuff. And, I try to mix up the note taking with some sort of activity."[a]
Pattern to School Day	"School at 6:15. Get stuff together for the day. Work on whatever students have dropped off. Get stuff together for…after school. Teach three periods. Go to meetings. After school I practice some CDE team… Work with greenhouse and animals. Go home around 6 or 7."[f]
Pattern to School Year	"I can pretty much tell you based on last year … what's coming up and what I am going to spend my time doing for the next three weeks."[b]
Pattern to Summer	"Before state convention it's … practicing for teams during the day … and, then state convention… camp… and, then leadership school, then about the middle of July… SAE visits [are] all we do."[f]
Pattern guided by FFA/CDEs	"Last fall I did dairy judging…then this semester I had a junior ag sales team and … Farm Business team… I am doing a livestock judging team right now." [a]
Pattern is Seasonal	"Spring is more … hands-on and the fall is more …classroom."[d]

	"In the fall, the majority of my time goes just into classroom instruction. Now in the springtime … I would say a majority of my day goes to state degrees, proficiencies, contests."[c]
Pattern is Influenced by Non-instructional Events	"Think about fair week. That is way more than 70 hours. Think about national convention. Preparing for that is way more than 70 hours."[f]

[a]1st year; [b]2nd year; [c]3rd year, multi-teacher; [d]3rd year, single teacher; [e]4th year; [f]5th year; [g]6th year

The second objective sought to describe the phenomenon of teacher time as characterized by early career teachers. For this objective, two major themes emerged regarding the allocation of work time as well as the adaptation and evolution of time as described by early career teachers.

There is a conscious allocation of work time

These early career teachers seemed to have recognized when they work best as well as what time they will not give up for school work (see Table 2). Some have decided to work all seven days at school as part of their routine. Making this decision to work at school every day has allowed them not to take work home while other teachers do. One teacher stated "You do what you can do and you make it work" while also saying "I don't like to brag on myself but you know I do spend many hours at school". However, it was very telling that more than one teacher stated "I am really only at home to sleep."

Table 2 - *Allocations of work time*

	Yes	***No***
Working on Weekends	"Sometimes I take it home and I never touch it 'cause I just don't want to…this weekend, I will be grading SAE books at home all weekend."[a] "I have to feed the animals every day on the weekend."[a]	"I have to have some me time to get away from here and my weekends are for that."[g]
Working at Home	"During the weeknights…I have a computer at home and I would much rather go home, sit there and do my PowerPoints than … sit at school until 10:00 doing them."[b]	"Since I am home very little I try to take as little home as possible…I am…showing up maybe just 30 minutes earlier or something in the morning and try to do maybe grading of papers then and or just

	"I am going to have to find a happy medium…because I am finding myself getting a day late and a dollar short…in the classroom…so I am going to try to do that at my home."[g]	doing whatever I need to do whether its new PowerPoints or something like that in the morning."[d]
Downtime at school	"Take a mental break… and you just have to step back and count to 10, whether it's between classes … I try to do my best every single period whether it is in class or between classes or whatever to have a moment where at some point we are laughing about something."[f]	"I try to utilize every minute that I have, even in between classes…I try to get in a phone call or return a couple emails."[g] "You never will find me just sitting and staring out into space while students work on a project…I utilize that time to get other things done."[g]

[a]1st year; [b]2nd year; [c]3rd year, multi-teacher; [d]3rd year, single teacher; [e]4th year; [f]5th year; [g]6th year

The process of managing time adapts and evolves over time

The teachers in the study all talked about how the time they spend on the job has evolved. Those in the first and second years talked about living day-to-day while the teachers in years three through six could recall how difficult the earliest years were. As the teachers advanced in their careers, they talked about how planning for instruction had become easier and less time consuming. However, they noted they were not necessarily spending less time at work. Teachers were simply re-allocating that instructional planning time to FFA and SAE events (see Table 3).

Table 3 – *Sub-themes from the evolution of time*

Sub-themes	Teacher Quotations
The earliest years are hardest	"My first year first semester… I don't know if I left here before 10 for the first two or three months and I was here at 6am, you could set your clock by that."[f] "Well, this semester is a lot easier than last semester….last semester was my first semester… and I had three preps… it was a day to day thing. Like, during third period I was getting ready for 4th."[a] "My first year teaching…I would come in at 6:30 to 6:45 in the morning and… I would sometimes stay until 9 or 10:00 at night. I was not married. I lived 20 minutes away from school."[g] "First year to two years was spent primarily doing that kinda paperwork and … getting familiar with the curriculum…then… I didn't have to worry so much about the curriculum because I was

	teaching classes I was very familiar with already after having done it for 3 years."[g]
Planning gets easier	"… I would say I am spending the least amount of time that I have spent at school during my career so far. Last year…I was still staying until 5:00 or 5:30. I would get to school about 7:00 and I would stay until 5:00 or 5:30 and, of course, this year … I don't get to school until 7:30 and I have to leave by 4:20 … because of my family commitments."[g]
	"I think I am getting a little faster knowing what needs to happen and getting it done earlier."[b]
FFA fills the time space when planning efficiency improves	"And then somehow you still manage to fill that time with something else like I don't spend it planning but we seem to be doing 16 more FFA things you know so you are doing that instead but I just lessen the time I spend planning and just spend it doing other things."[b]

[a]1st year; [b]2nd year; [c]3rd year, multi-teacher; [d]3rd year, single teacher; [e]4th year; [f]5th year; [g]6th year

Objective three sought to describe the intersection of stress and time for early career teachers of agriculture. Two themes emerged for this objective as outlined below regarding the weaving of personal time with work, and tensions regarding how teachers spend their time.

Personal and social time for the teacher is woven into or around work

It seemed that even when talking about social or personal time, school was factored into the decision. The thoughts might have involved how the social time affects school or how school is creating a lack of social time, but the two seemed to be inexplicably tied. Even though their time seems to be arranged around the school schedule, teachers agreed that it was necessary to find social and personal time, either as a vacation, or after school, on the weekends, or even in some smaller way during the actual school day. Many teachers talked about how their family was being impacted by, or making an impact upon, their role as an agriculture teacher (see Table 4).

Table 4 - *Sub-themes regarding personal and social time*

Sub-themes	**Teacher Quotations**
School affects social time	"I have found out as Ag teachers there is always something to do and whether it is to fix the welder or whether it is to grade papers or whatever put grades in the computer, I think there are times when I just say well you know it's 6:00 I am going to take the wife out for dinner tonight or something so I think you have to be smart with it to just say tonight is me time."[d]

	"[Work] stuff is always in the back of your head."[f]
School affects family/relationships	"My husband and I have had a long discussion about this because we have to find that happy balance, the happy medium."[g]
	"We look around and consider to be some of the best Ag teachers you know in the state…we also see that a lot of times their family life did not go so well. They spent a lot of time at school probably and lost their wives in the deal and I know several Ag teachers that have been divorced."[d]
Relationships blur with school time	"I… involve the wife and she goes to a lot of places with us...She'll come up and she'll like train the Ag sales team…. She'll go on … officer retreat with us where I need a female chaperone."[d]
	"I am getting married this summer. It will be the first week that I have taken an entire week and not come to school and not done anything related to my job…I think it is going to be real positive because … it's gonna sorta give us a third ag teacher that is a female."
School affects vacations	"I take a weekend trip to the beach, but that doesn't happen in the spring time. I can do that in the summer. I can do it …in the fall, if we aren't training for nationals. I do a lot at Christmastime." [f]
	"I don't know that I would ever be able to use an entire months' vacation in the summer."[b]

[a]1st year; [b]2nd year; [c]3rd year, multi-teacher; [d]3rd year, single teacher; [e]4th year; [f]5th year; [g]6th year

Beginning teachers experience tensions between how they would like to spend their time and how they actually spend their time

The teachers had ideas about how they would want to spend their time and this did not always coincide with how they were spending their time. The teachers were asked if there was a part of their job they would choose to do all day (and nothing else), what would that be? Five teachers answered they would want to only do the teaching part with one saying "If I could do something every day it would be... just teach the kids that wanted to be there." Two teachers answered they would only do the FFA part of the job with one stating, "the whole reason I became an ag teacher was for FFA stuff and that is what I love to do." Additional items came up that teachers indicated they wanted to be doing while they seemed pulled into another direction (see Table 5).

Table 5 - *Sub-themes within tensions of time theme*

What teachers	**What teachers said they were doing**

wanted to be doing	
Teaching	"You have to spend an hour in the office talking with this kid and their parent or whether it's just a silly piece of paperwork that seems to take forever to fill out… people that just seem to take your time up …or it's the principal coming down and saying "hey … we need you to do this." [d]
FFA	"Fill out this paper, this kid needs a pass, you need to write a discipline slip on this kid, you need to fill out this paperwork to go on this trip, you need this for this."[d]
Planning	"My…plan period which is … not used for planning. I usually try to return phone calls, and chat with my teaching partner about issues related to the FFA chapter and because I have … a child, I have to leave school by 4:00."[g]
Saying No	"We are so competitive and we want to be so involved that we just keep piling those things on and …I know that it is not good for me, but in my mind I rationalize it saying that it is going to be good for the kids or that it's giving them an opportunity."[g]
Getting it all done	"If I had that time to … I would be a more efficient teacher in the classroom. But, I just… can't do everything."[g] "A lot of times I don't get done what I wanted to [because I am] interrupted in class a lot of times."[d]

[a]1st year; [b]2nd year; [c]3rd year, multi-teacher; [d]3rd year, single teacher; [e]4th year; [f]5th year; [g]6th year

Conclusions/ Recommendations/ Implications

Time is a scarce resource among these early career teachers; however, these early career teachers talk about time in a hopeful, yet accepting, way. They accept a heavy workload as part of the job. They hope they will get better at managing their time and acknowledge that during their tenure thus far, instructional planning has improved each semester. They agree that the job is a twelve month position. They acknowledge that having greenhouses and livestock on campus affords them teaching opportunities that they might not otherwise have and are willing to trade some time every weekend to maintain this opportunity. All of the teachers in this study reported working well over a 40 hour work week, every week. This is consistent with prior research (Croom, 2003; Straquadine, 1990; Nelson & O'Brien, 1993; Torres et al., 2008). These findings imply that workload and time management could be a major source of teacher stress and ultimately lead to burnout as indicated by Moore and Camp (1979). It is recommended that further quantitative research be conducted to examine the ways in which teachers cope with the workload stress. Further research could compare early to more seasoned

teachers regarding time management and coping strategies. Further, it is recommended that a similar qualitative inquiry be conducted to examine the notion of teacher time on a deeper level with more experienced or seasoned teachers to determine if they ways in which they conceptualize time is different later in a teaching career.

A further conclusion from the findings of this study was that time for teachers is consciously allocated and patterned, and even woven into their own personal down time. The days and years tended to run in patterns, but teachers were always anticipating the unexpected that goes against those plans. Further, teachers expressed a lack of down time during the pattern of the workday, consistent with teachers telling of their allocation, management, and lack of time. Teachers mentioned that, in order to accomplish all of the work required of them in one day, they were multi-tasking in class, working during passing periods, working through lunch breaks, and working their entire planning periods. This finding was a bit different from the literature that indicated teachers are working many hours (Torres, Ulmer, & Aschenbrener, 2007) in that it highlighted the conscious patterning of time and illustrated a true absence of down time for teachers.

While this can be viewed as a positive and a potential testament to their productivity and time management, the implication of this finding is that an absence of "down time" leaves little time for coping, reflection on teaching, or even time to regenerate and regroup. It is recommended that teachers should figure out times that are most productive and adjust their schedule to accommodate, while leaving downtime and time to reflect and rejuvenate within a day. Individuals who can find their true work rhythm and work within the times they are productive might accomplish the same tasks with less time and energy. Are these teachers forcing themselves to work against their natural work tendencies? Further quantitative studies should be conducted on the impact of lack of down time on how teachers reflect and think on and about their teaching practice.

A third conclusion from this study is that while time and the use of time is an evolving process as one progresses in years of teaching, the work-load increases to fill up available time. The implication of this finding is that teachers, while becoming more efficient and effective in planning and other management activities and thereby saving time, are not getting that saved time back because they then fill the found time with more activities. Further quantitative studies should be conducted comparing the amount of time teachers spend working in a typical week (on all work-related activities) and compare student learning and FFA outcomes between teachers who work differing numbers of hours during the week. In short, does it truly make a difference in regard to student outcomes if a teacher is working 80 hour work weeks, and why do teachers wear extended time at work as a badge of honor?

Finally, it was concluded that teachers experience external stressors that create tensions between how they spend their time and how they would like to spend their time, thereby changing how they work and what they do or do not accomplish. The teachers in this study reported that they would prefer to spend their time teaching, going to FFA activities, and managing a program as opposed to dealing with parent or administrative

problems or paperwork. This finding is consistent with previous research on teacher stress (Montgomery & Rupp, 2005) that identified student problems, administrators, and workload as particular external stressors that shape and change how teachers spend their time. It is recommended that further quantitative studies be conducted regarding comparisons between how teachers would like to spend their time and how they currently spend their time and its impact on teacher motivation, teaching effectiveness, and teacher attrition.

This study was the beginning of an investigation of the phenomenon of teacher time, workload and stress. It can serve as a starting point for individuals engaged in teacher development to further provide mechanisms to help teachers manage time. Further investigations should evolve this notion of teacher time and explore the exact nature of coping and stress as it leads to burnout among agriculture teachers to ensure that the profession is able to retain a number of high quality, successful teachers for future generations.

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The Meaning Early Career Agriculture Teachers Ascribe to their Time

A Critique by John C. Ricketts, University of Georgia

This was a study focusing on what many consider to the primary issue facing secondary agricultural education – the teacher shortage. While most studies looking at this issue are not only warranted, but also very important, this study, which utilizes qualitative research to go deeper into the specific concern of time's impact on teacher stress, is one of the most relevant and revealing works I have read on the issue. The authors are to be commended for taking the time to embark upon what must have been a very messy process of making meaning of this issue among a selected group of early career agriculture teachers. At the beginning of the article I was wondering what's the big deal about working 45-65 hours per week (Cole, 1981), but then as I started reading the qualitative responses of those surveyed I found myself asking the question, "Why would anyone want to be an agriculture teacher?" Readers and researchers interested in a behind the scenes look at why many teachers leave our profession should take the time to digest this article, and then identify questions in their respective states which may lead to a reduction in the teacher shortage and an increase in quality of life for agriculture teachers.

The introduction in this paper very appropriately articulates the problem of the teacher shortage, and the theoretical framework of teacher stress (Montgomery & Rupp, 2005) suitably guides this study. The methods used and findings reported are reflective of competent researchers who understand the right way to do phenomenological research. The methods section is very thorough; perhaps too descriptive of qualitative research itself, but understanding qualitative research's limited use thus far in our profession I concede that extra description and definition of its methods are often required in our field. The discussion and recommendations are also direct and a call to action. Specifically, I'd like to hear responses to the following questions, one of which was posed by the author(s).

1. How much time is too much time for an agriculture teacher?

2. Are we teaching time management in our teacher education program?

3. With time the job gets easier, but teachers continue to add to their workload. Is this from addition to the pressure or pressure from others to do more? If the later, who is it providing this pressure to increase workload?

4. "…why do teachers wear extended time at work as a badge of honor?"