PROCEEDINGS
2008
SOUTHERN AGRICULTURAL EDUCATION RESEARCH CONFERENCE

HELD IN CONJUNCTION WITH THE MEETING OF THE SOUTHERN ASSOCIATION OF AGRICULTURAL SCIENTISTS

Hosted by
The North Carolina Agricultural Education Programs

NC STATE UNIVERSITY

February 2-5, 2008 – Dallas, Texas
Adam's Mark Hotel

Research Conference Information

A total of 58 papers were submitted for consideration to be presented at the conference. Each paper was sent to three reviewers for a blind review. A total of 29 papers were selected which is a 50% response rate. The following professionals were involved in the review process.

Lloyd	Bell
Bob	Birkenholz
Harry	Boone
Thomas	Bruening
Ben	Byler
Bill	Camp
Susan	Camp
Jamie	Cano
Jim	Connors
Jacque	Deeds
Jack	Elliot
Jim	Flowers
Ed	Franklin
Bryan	Garton
Joe	Gliem
Brad	Grieman
Steve	Harbstreit
Penny	Hasse-Wittler
Tracy	Hoover
Dann	Husmann
Gary	Jackson
Dick	Joerger
Jim	Knight
Joe	Kotrlik
Dale	Layfield
Vern	Luft
Bob	Martin
Greg	Miller
Larry	Miller
Travis	Park
Jerry	Peters
Rama	Radhakrishna
Matt	Raven
Carl	Reynolds
Steven	Rocca
Ben	Swan
Mike	Swan
Allen	Talbert
Rob	Terry
Greg	Thompson
Bobby	Torres
Cary	Trexler
Susie	Whittington
Ed	Yoder

SUNDAY FEBRUARY 3

10:30 - 12:00 p.m. Concurrent Research Session I

Session A: Extension Education ..... City View 1

Chair: Christopher Mathis, South Carolina State University
Discussant: David Lawver, Texas Tech University
Facilitator: Rick Maxwell, Texas Cooperative Extension Service

Relationships Between the Perceived Characteristics of E-Extension and Barriers to Its Adoption
Amy Harder, University of Florida & James Lindner, Texas A&M University

Influences on Florida Agricultural Extension Agents' Decisions to Remain in the Extension Organization
Shannon Arnold, University of Florida; Nick Place, University of Maryland; Ed Osborne, University of Florida; Glen Israel, University of Florida & Saundra Tenbroeck, University of Florida

Extension Agents' Educational Preferences for Learning About Conservation Tillage Systems
K. S. U. Jayaratne, North Carolina State University; Julia W. Gaskin, University of Georgia; R. Dewey Lee, University of Georgia; D. Wayne Reeves, USDA ARS & Gary Hawkins, University of Georgia

There are no printed discussant remarks. The original discussant withdrew because of a medical reasons and Dr. Lawver graciously accepted this assignment at the last minute.

Session B: Teacher Preparation..... City View 2

Chair: Shane Robinson, Oklahoma State University
Discussant: George Wardlow, University of Arkansas
Facilitator: Tanya Franke, Oklahoma State University

Cooperating Teachers' Perceptions of Student Teachers' Learning Gaps in FFA, Leadership Development, SAE and Program Management
Amy Crump, Habersham Central High School (Georgia); John C. Ricketts, University of Georgia; Dennis W. Duncan, University of Georgia and Jason B. Peake, University of Georgia

Perspectives of Successful Agricultural Science and Technology Teachers on their Preparation to Teach Agricultural Mechanics
Richard K. Ford, Glen C. Shinn, Texas A&M University & David E. Lawver, Texas Tech University

Structured Communication: Effects on Student Teacher – Cooperating Teacher Relationships
Don W. Edgar, South Dakota State University; T. Grady Roberts, Texas A&M University & Tim Murphy, Texas A&M University

Exploring the Effects of Structured Communication on Teaching Efficacy of Student Teachers and Student Teacher – Cooperating Teacher Relationships
Don W. Edgar, South Dakota State University; T. Grady Roberts, Texas A&M University & Tim Murphy, Texas A&M University

Discussant Remarks

Session C: Secondary Agricultural Education Programs .....Dallas Ballroom A2

Chair: Thomas Broyles, Virginia Tech
Discussant: Todd Brashears, Texas Tech University
Facilitator: Rebecca McGovney-Ingram, Texas A&M University

Secondary Agricultural Science as Content and Context for Teaching
T. Grady Roberts, Texas A&M University & Anna L. Ball, University of Florida

Identifying Early Career Secondary Agriculture Teachers' Needs and Preferences of Support
Ann M. De Lay, University of Florida & Shannon Washburn, University of Florida

Quality Indicators of Secondary Agricultural Education Programs
Charles Cordell Jenkins, III, Rolla Technical Institute (Missouri) & Tracy Kitchel, University of Kentucky

Discussant Remarks

MONDAY, FEBRUARY 4

8:30 - 10:00 a.m. Concurrent Research Session II

Session D: Leadership Development ..... City View 1

Chair: David Jones, North Carolina State University
Discussant: Marcus Comer, North Carolina A&T State University
Facilitator: Amber Houck, University of Kentucky

FFA Chapters Involved in Civic Engagement Describe Member Role and Context of Leadership Activities
Robin Peiter Horstmeier, University of Kentucky; Brittany Wilkinson, University of Kentucky & Cameron C. White, University of Kentucky

Exploring Goal-Setting as a Tool for Leadership Development
Eric K. Kaufman, Virginia Tech; Glenn D. Israel, University of Florida & Rick Rudd, Virginia Tech

Professional Development for Local Volunteer Leaders: A Conceptual Plan
Eric K. Kaufman, Virginia Tech; Hannah S. Carter, University of Florida & Rick Rudd, Virginia Tech

Engaging Hispanic Students in Agricultural Education and the FFA: A Case Study
T. Grady Roberts, Texas A&M University; Johnathan L. Hall, Texas A&M University; Gary Briers, Texas A&M University; Ernie Gill, National FFA Organization; Glen Shinn, Texas A&M University & Alvin Larke, Jr., Texas A&M University

Discussant's Comments

Session E: Higher Education..... City View 2

Chair: Kim Dooley, Texas A&M University
Discussant: Barbara Kirby, North Carolina State University
Facilitator: Holly Kasperbauer, Virginia Tech

Student Experiences as Peer Learning Assistants in the Life, Agricultural, and Natural Sciences
Anna Ball, University of Florida & Neil Knobloch, Purdue University

Academic Advising: Does a Match Between Advisors' Academic Advising Style and Students' Preferred Advising Style Have an Effect on Student Satisfaction?
Margo D. Hale, University of Arkansas; Donna L. Graham, University of Arkansas & Donald M. Johnson, University of Arkansas

Levels of Student Development in the College of Agricultural and Life Sciences at the University of Florida
Brian Estevez, University of Florida & Ed Osborne, University of Florida

Discussant Remarks

Session F: Academic Integration in Agricultural Education ..... City View 3

Chair: Jay Morgan, Murray State University
Discussant: David Doerfert, Texas Tech University
Facilitator: Shauna Holder, Mississippi State University

Effects of a Math-Enhanced Curriculum and Instructional Approach on Student's Achievement in Mathematics: A Year-long Experimental Study in Agricultural Power and Technology
R. Brent Young, North Dakota State University; M. Craig Edwards, Oklahoma State University & James Leising, Oklahoma State University

Self-Reported Level of Mathematics Integration of Outstanding Virginia Agricultural Educators
Ryan Anderson, Murray State University, Robert (Bob) Williams, Texas A&M University – commerce & John Hillison, Virginia Tech.

Integrating Academics into Agriculture Programs: A Delphi Study to Determine Perceptions of the National Agriscience Teacher Ambassador Academy Participants
Brian E. Myers, University of Florida & Gregory W. Thompson, Oregon State University

Discussant Remarks

TUESDAY, FEBRUARY 5

8:00 - 9:30 a.m. Concurrent Research Session III

Session G: The Profession ..... City View 1

Chair: Ben Byler, Tennessee Tech University
Discussant: Randol Waters, University of Tennessee
Facilitator: Landon Summers, Mississippi State University

Research Themes, Authors, and Methodologies in The Journal of Agricultural Education: A Ten Year Look
Leslie D. Edgar, University of Arkansas; Don W. Edgar, South Dakota State University, Gary E. Briers, Texas A&M University & Tracy Rutherford, Texas A&M University

Research Themes in Agricultural Education: Future Gap Analysis of the National Research Agenda
Leslie D. Edgar, University of Arkansas; Gary E. Briers, Texas A&M University & Tracy Rutherford, Texas A&M University

Factors Influencing Faculty Migration to Department Chair Positions in Colleges of Agricultural and Life Sciences
Elio Chiarelli, Jr., University of Florida & Ed Osborne, University of Florida

Discussant Remarks

Session H: Experiential Learning ..... City View 2

Chair: Carrie Fritz, University of Tennessee
Discussant: James Dyer, University of Florida
Facilitator: Mary Brister, Mississippi State University

High School Principal's Current Perceptions Regarding Supervised Agricultural Experience
John Rayfield, North Carolina State University & Beth Wilson, North Carolina State University

Defining Utilization of The Texas Agricultural Science Record Keeping System According to Stakeholder Insight: A Delphi Study
J. Chris Haynes, Oklahoma State University; Kyle W. McGregor, Tarleton State University; Kimberly Bellah; Tarleton State University & David Drueckhammer, Tarleton State University

Examining iPod Use by Texas Agricultural Science and Technology Teachers
Theresa Murphrey, Texas A&M University; Kimberly Miller, Texas A&M University & T. Grady Roberts, Texas A&M University

Discussant Remarks

Session I: Inquiry-Based Learning..... City View 3

Chair: Cliff Ricketts, Middle Tennessee State University
Discussant: James Flowers, North Carolina State
Facilitator: Jill Casten, Virginia Tech

Problems and Inquiry-Based Learning: A Theoretical and Practical Synthesis
John C. Ricketts, University of Georgia; Jon Ramsey, Oklahoma State University & Donna Moore, Virginia Tech

Influence of Creative Problem Solving upon Ninth Grade Student Achievement and Satisfaction
Kim Alexander, Roscoe, TX Independent School District; Matt Baker, Texas Tech University; Glen C. Shinn, Texas A&M University & Jacob Tiemann, Roscoe, TX Independent School District

Agriculture Teacher Perceptions of Preparation to Integrate Science and Their Current use of Inquiry Based Learning
Shannon Washburn, University of Florida & Brian E. Myers, University of Florida

Discussant Remarks

Posters

RELATIONSHIPS BETWEEN THE PERCEIVED CHARACTERISTICS OF E-EXTENSION AND BARRIERS TO ITS ADOPTION

Amy Harder, University of Florida
James R. Lindner, Texas A&M University

Abstract

In 2006, Cooperative Extension launched an online information source known as eXtension. Perceptions of eXtension's characteristics, and potential barriers to adoption, are likely to influence an extension agent's decision to adopt eXtension. An online survey instrument was used to collect information related to the adoption of eXtension by Texas Cooperative Extension county extension agents. The primary variables for the study were: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, (e) observability, (f) concerns about time, (g) concerns about incentives, (h) financial concerns, (i) planning issues, and (j) technology concerns. Low, negative relationships were found to exist between perceptions of relative advantage and concerns about time, as well as perceptions of compatibility and planning issues. Financial concerns had a low, negative relationship with relative advantage, compatibility, complexity, and trialability. Adequate planning can increase the likelihood that an innovation will be adopted rapidly, but financial concerns must be thoroughly addressed. Reducing or eliminating the barriers related to the perceived characteristics of eXtension would be expected to increase agents' rate of adoption.

Introduction

In 2002, a Cooperative State Research, Education, and Extension Service (CSREES) white paper warned, "The capacity of the Extension System to change is swiftly eroding through decreasing human resources and decreasing financial capital" (Crosby et al., Problem/Need section, ¶ 2). CSREES is not the only entity to have expressed its concern with the current state of Cooperative Extension; it has been observed that "cultural and technological changes are quickly outpacing the traditional Extension delivery model" (Accenture, 2003, p. 5). Budgetary concerns plague Extension programs across the country, as they have for years (McDowell, 2004). Extension's funding woes have created unmet needs in many communities and threatened the collaborative nature of the system by forcing partners into direct competition with each other to receive federal dollars (Payne, 2004). The unstable financial situation highlights the need for Extension to move beyond the status quo and embrace innovative methods of educational outreach.

An online information resource known as eXtension (pronounced e-extension, www.extension.org) was developed by the Cooperative Extension System as an innovative solution to address some of Extension's challenges. eXtension was described as "a national Internet-based information and education network that provides public access to land-grant university (LGU) expertise" (McCarthy & Hutchinson, 2004, The Opportunity section, ¶1). It is hoped that eXtension will (a) reduce the duplication of efforts between states, (b) produce profits, (c) increase visibility, and (d) increase customer satisfaction (Accenture, 2003). These benefits are unlikely to be realized without the adoption of eXtension by county-level Cooperative Extension agents and educators (Accenture, 2003). An investigation of the factors affecting agents' adoption of eXtension would be considered prudent for planning the successful implementation of eXtension.

Theoretical Framework

The theoretical framework for this study was developed from Rogers' (2003) theory of the diffusion of innovations. According to Rogers, an innovation is "an idea, practice, or object that is perceived as new by an individual" (2003, p. 12). When an individual first learns of an innovation, he/she has entered into the first stage of the innovation-decision process. Rogers defined the innovation-decision process as

> the process through which an individual … passes from first knowledge of an innovation, to the formation of an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision (2003, p. 20).

The speed with which individuals pass through the innovation-decision process is partially dependent upon the individuals' view of an innovation's characteristics. Rogers (2003) described five such characteristics: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability. Relative advantage is "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 2003, p. 15). Perceptions of relative advantage are largely subjective, but are often linked to social prestige factors and convenience. Compatibility is "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003, p. 15). Innovations which appear to be compatible with an individual's social system are more rapidly adopted. Complexity is "the degree to which an innovation is perceived as difficult to understand and use" (Rogers, 2003, p. 16). As would be expected, innovations that are easy to use have the fastest rates of adoption. Trialability is "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 16). Experimenting with an innovation on a trial basis reduces the uncertainty individuals often have and increases the rate of adoption. Finally, observability is "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 16). Observable innovations instigate discussion amongst peers, thereby increasing the rate of adoption.

Researchers have often framed their research in terms of the barriers to adoption; that is, those factors which are thought to negatively impact an individual's perceptions of an innovation (Berg, Muilenburg, & Van Haneghan, 2002; Berge, 1998; Curbelo-Ruiz, 2000; Haber, 2006; Kuck, 2006; Maguire, 2005; Murphrey & Dooley, 2000; Murphy & Terry, 1998; Nelson & Thompson, 2005; Porter, 2004; Roberts & Dyer, 2005). However, few studies have focused exclusively upon the relationship between an individual's perceptions of the characteristics of an innovation and perceptions of barriers to the adoption of that innovation. One such study investigated Web-based distance education, a close cousin to eXtension. Li (2004) examined the relationships between faculty perceptions of Web-based distance education and the barriers to that innovation. Relative advantage, compatibility, complexity, and trialability were related to one or more perceived barriers. Li concluded the elimination of perceived barriers would positively, and significantly, influence faculty perceptions of Web-based distance education. Schifter (2000) concurred with Li, noting that participant adoption increases when barriers and inhibitors are eliminated. Likewise, the identification of similar relationships with regard to eXtension may provide an understanding of how to expedite its adoption.

Purpose and Objectives

The findings presented in this article were part of a larger study undertaken to understand the influence of selected factors on the adoption of eXtension by Texas Cooperative Extension county extension agents (Harder, 2007). The section of the study presented here was correlational in nature. The objective was to describe relationships between agents' perceptions of eXtension based upon Rogers' (2003) characteristics of an innovation, and their perceptions of potential barriers to the adoption of eXtension.

Procedures

The target population was Texas Cooperative Extension county extension agents employed in 2007. According to the Texas Cooperative Extension office, there were 533 county agents (K. A. Bryan, personal communication, February 12, 2007). Cochran's (1977) formula was used to determine the sample size (N = 237) for the study. County extension agents were randomly selected to participate (Gall, Gall, & Borg, 2007).

An online questionnaire was used to collect data. The original instrument was developed by Li (2004) to examine the diffusion of distance education at the China Agricultural University. Li's original instrument was modified by the researcher to fit the context of eXtension, based upon constructs adopted from Li (2004), Rogers (2003), and related studies from the literature. It was then converted to an online format.

The instrument was reviewed for content validity by a panel of experts composed of faculty members in the Department of Agricultural Education, Leadership, and Communications at Texas A&M University and the national marketing director of eXtension. A pilot study was conducted to test face validity and establish reliability.

The instrument contained four sections. Sections Two and Three were related to the objectives reported here. The second section asked participants to rate their agreement with 28 statements related to their perceptions of eXtension, based upon a six-point Likert-type scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Somewhat Agree*, 5 = *Agree*, 6 = *Strongly Agree*). The scale was interpreted as follows: *Strongly Disagree* = 1.00 – 1.50, *Disagree* = 1.51 – 2.50, *Somewhat Disagree* = 2.51 – 3.50, *Somewhat Agree* = 3.51 – 4.50, *Agree* = 4.51 – 5.50, *Strongly Agree* = 5.51 – 6.00. Rogers' (2003) characteristics of an innovation were used to categorize the statements into constructs as follows: (a) relative advantage, (b) compatibility, (c) observability, (d) trialability, and (e) complexity. The third section asked participants to rate their agreement with 31 statements related to their perceptions of potential barriers to eXtension, using the same Likert-type scale as the second section. The statements were clustered into five constructs: (a) concerns about time, (b) concerns about incentives, (c) financial concerns, (d) planning issues, and (e) technology concerns.

The reliability of the instrument was tested by calculating Cronbach's alpha coefficient for each internal scale (Cronbach, 1951). A reliability level of .80 or higher was considered acceptable (Gall, Gall, & Borg, 2007). Reliability levels for the internal scales are presented in Table 1.

Table 1
Reliability Levels of Internal Scales

Internal Scale	α Levels
Relative Advantage	.887
Compatibility	.873
Complexity	.860
Trialability	.952
Observability	.881[a]
Concerns about time	.890
Concerns about incentives	.924
Financial concerns	.909
Planning issues	.921
Technology concerns	.883

Note: Reliability levels ≥ .80 were considered acceptable.
[a]Original α level was .758; one item was deleted.

Data were collected online according to Dillman's (2000) tailored design method. Of the original 237 e-mail addresses, 236 were valid. A final response rate of 66.90% (N = 158) was obtained. Eight participants opted out. There were 25 responses removed due to missing or incomplete data, reducing the number of usable responses to 125.

Non-response error was controlled by comparing early and late respondents on the primary variables of interest. Results may generalized to the target population when no significant differences exist between early and late respondents (Lindner, Murphy, & Briers, 2001). There were no significant differences between early and late respondents for the majority of the primary variables of interest, with the exception of observability. Findings related to observability are limited to the sample due to the significant difference between early and late respondents.

The majority of respondents had primary responsibilities in the areas of agriculture (n = 45), family and consumer sciences (n = 39), and 4-H/youth development (n = 26). There were fewer agents in the areas of horticulture (n = 8) and natural resources (n = 3). No respondents reported community development as a primary agent role. All of the respondents had obtained a minimum of a bachelor's degree. Most (84.8%) of the agents were at least thirty years of age. Approximately 46% of respondents were female and 51% were male.

Relationships between perceptions of eXtension and potential barriers were described by calculating Pearson's product-moment correlation coefficient. Davis' (1971) interpretation of Pearson's r was used to describe the strength of the relationships, as shown in Table 2.

Table 2
Relationship Descriptors

Descriptor	Coeffiecient (*r*)
Very strong	$r \geq .70$
Substantial	$.50 \geq r \geq .69$
Moderate	$.30 \geq r \geq .49$
Low	$.10 \geq r \geq .29$
Negligible	$.01 \geq r \geq .09$

Findings

The objective was to describe the relationships between perceptions of eXtension and potential barriers to the diffusion of eXtension. Agents' perceptions of eXtension were described according to (a) relative advantage, (b) compatibility, (c) observability, (d) complexity, and (e) trialability. Potential barriers to the adoption of eXtension were analyzed according to (a) concerns about time, (b) concerns about incentives, (c) financial concerns, (d) planning issues, and (e) technology concerns. The means and standard deviations for the primary variables are presented in Table 3, so that the findings which follow may be interpreted in context.

Table 3
Descriptive Statistics for the Primary Variables

Variable	*M*	*SD*
Complexity	4.48	.77
Compatibility	4.35	.87
Concerns about time	4.12	.87
Trialability	4.11	.88
Concerns about incentives	3.90	1.00
Planning issues	3.84	.93
Financial concerns	3.77	1.01
Relative advantage	3.75	.82
Technology concerns	3.66	.97
Observability	2.85	.98

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

Relative Advantage

The correlations between respondents' perceptions of relative advantage and the potential barriers to the diffusion of eXtension are presented in Table 4. A significant, low negative relationship existed between perceptions of concerns about time and perceptions of relative advantage, r (125) = -.21, $p < .05$. A significant, low negative relationship existed between perceptions of financial concerns and perceptions of relative advantage, r (125) = -.20, $p < .05$. No other significant relationships existed.

Table 4
Correlations between Perceptions of Potential Barriers to eXtension and Relative Advantage

	Relative Advantage		
Potential Barrier	*r*	*p*	Magnitude
Concerns about time	-.21*	.02	Low
Concerns about incentives	-.10	.29	
Financial concerns	-.20*	.03	Low
Planning issues	-.16	.08	
Technology concerns	-.06	.53	

Note. Magnitude: $.01 \geq r \geq .09$ = Negligible, $.10 \geq r \geq .29$ = Low, $.30 \geq r \geq .49$ = Moderate, $.50 \geq r \geq .69$ = Substantial, $r \geq .70$ = Very Strong.
*$p < .05$.

Compatibility
The correlations between respondents' perceptions of compatibility and the potential barriers to the diffusion of eXtension are presented in Table 5. A significant, low negative relationship existed between perceptions of financial concerns and perceptions of compatibility, r (125) = -.20, $p < .05$. A significant, low negative relationship existed between perceptions of planning issues and perceptions of compatibility, r (125) = -.23, $p < .05$. No other significant relationships existed.

Table 5
Correlations between Perceptions of Potential Barriers to eXtension and Compatibility

	Compatibility		
Potential Barrier	*r*	*p*	Magnitude
Concerns about time	-.10	.25	
Concerns about incentives	-.05	.55	
Financial concerns	-.20*	.02	Low
Planning issues	-.23*	.01	Low
Technology concerns	-.08	.36	

Note. Magnitude: $.01 \geq r \geq .09$ = Negligible, $.10 \geq r \geq .29$ = Low, $.30 \geq r \geq .49$ = Moderate, $.50 \geq r \geq .69$ = Substantial, $r \geq .70$ = Very Strong.
*$p < .05$.

Observability
The correlations between respondents' perceptions of observability and the potential barriers to the diffusion of eXtension are presented in Table 6. There were no significant relationships between potential barriers to the diffusion of eXtension and observability. All associations were low or negligible.

Table 6
Correlations between Perceptions of Potential Barriers to eXtension and Observability

	Observability		
Potential Barrier	*r*	*p*	Magnitude
Concerns about time	-.01	.90	
Concerns about incentives	-.15	.11	

Financial concerns	-.10	.39
Planning issues	-.03	.75
Technology concerns	-.14	.12

Complexity

The correlations between respondents' perceptions of complexity and the potential barriers to the diffusion of eXtension are presented in Table 7. A significant, low negative relationship existed between perceptions of financial concerns and perceptions of complexity, r (125) = -.25, $p < .01$. No other significant relationships were found.

Table 7

Correlations between Perceptions of Potential Barriers to eXtension and Complexity

	Complexity		
Potential Barrier	*r*	*p*	Magnitude
Concerns about time	-.16	.08	
Concerns about incentives	.08	.40	
Financial concerns	-.25**	.01	Low
Planning issues	-.08	.38	
Technology concerns	-.15	.10	

Note. Magnitude: $.01 \geq r \geq .09$ = Negligible, $.10 \geq r \geq .29$ = Low, $.30 \geq r \geq .49$ = Moderate, $.50 \geq r \geq .69$ = Substantial, $r \geq .70$ = Very Strong.
**$p < .01$.

Trialability

The correlations between respondents' perceptions of trialability and the potential barriers to the diffusion of eXtension are presented in Table 8. A significant, low negative relationship existed between perceptions of financial concerns and perceptions of trialability, r (125) = -.21, $p < .05$. No other significant relationships were found.

Table 8

Correlations between Perceptions of Potential Barriers to eXtension and Trialability

	Trialability		
Potential Barrier	*r*	*p*	Magnitude
Concerns about time	-.15	.09	
Concerns about incentives	-.14	.12	
Financial concerns	-.21*	.02	Low
Planning issues	-.12	.20	
Technology concerns	-.06	.53	

Note. Magnitude: $.01 \geq r \geq .09$ = Negligible, $.10 \geq r \geq .29$ = Low, $.30 \geq r \geq .49$ = Moderate, $.50 \geq r \geq .69$ = Substantial, $r \geq .70$ = Very Strong.
*$p < .05$.

Conclusions

The objective was to describe the relationships between perceptions of eXtension (relative advantage, compatibility, observability, complexity, and trialability) and potential barriers (concerns about time, concerns about incentives, financial concerns, planning issues, and

technology concerns) to the diffusion of eXtension. There were no significant relationships between perceptions of observability and any potential barrier. This is consistent with Li's (2004) conclusion that perceptions of observability were not related to how faculty perceived potential barriers to Web-based distance education.

Concerns about time negatively affected how agents perceived relative advantage. This was not consistent with Li (2004), who concluded the perceived relative advantage of Web-based distance education was negatively related to planning issues. However, planning issues were negatively related to how agents perceived eXtension's compatibility. Li also found planning issues to be related to the perceived compatibility of Web-based distance education.

Financial concerns were most often related to perceptions of eXtension. Relative advantage, compatibility, complexity, and trialability were negatively affected by financial concerns. Only the relationship between complexity and financial concerns was supported by Li (2004).

Implications

It is important to note this study did not attempt to establish whether increasing eXtension's rate of adoption is a desirable outcome for Cooperative Extension agents. However, this assumption has been made for the purposes of framing discussion. Certainly this important question should be addressed prior to acting upon the implications and recommendations presented here.

Understanding the relationships between agents' perceptions of eXtension and potential barriers provides valuable information which may be used to effectively target resources allocated to promoting the adoption of eXtension. While decreasing or eliminating *any* of the five barriers identified in this study would be expected to positively increase perceptions of eXtension (Schifter, 2000), the results of this study indicated a particular need to address financial concerns. Financial concerns were related to perceptions of four out of five of the characteristics of eXtension. Decreasing or eliminating financial concerns would be expected to have the most significant impact on improving perceptions of eXtension and its rate of adoption.

As mentioned previously, the findings for this objective differed from Li's (2004) findings in several ways. Rogers' (2003) description of the diffusion process—an innovation diffuses through a *social system* over time—provides an explanation for the differences between the two studies. Although eXtension and Web-based distance education are similar innovations, the social systems associated with Chinese faculty members and Texas Cooperative Extension county agents are vastly different. Therefore, some discrepancies in perceptions were expected. It is for this reason that diffusion research must focus not only on the innovation itself, but the social system within which the diffusion is expected to occur.

Despite the differences in social systems, there was consistency between the two studies with regard to the lack of a relationship between observability and any of the perceived barriers. The nature of the online innovations studied may account for the common findings. Rogers (2003) noted that software components of innovations are difficult to observe and are associated with slower rates of adoption. Both Web-based distance education and eXtension qualify as software components, and therefore do not lend themselves towards establishing the same type of observability that might be associated with a more visible innovation, such as a hybrid car.

The results of this study also supported Li's conclusion that planning issues were negatively related to perceptions of compatibility. Planning issues, in the context of this study, included opportunities to learn about the innovation, how the innovation fit the vision of the organization, and the existence of a need for the innovation. Rogers (2003) listed these factors as influential in how individuals determine an innovation's compatibility. The implication is adequate planning can significantly increase the probability that adopters will view an innovation as compatible. As such, change agents should be cautioned against launching an innovation prematurely; patience will yield more fruitful rewards.

Recommendations

Recommendations for practice are based upon the assumption that increasing the adoption of eXtension by extension agents is desirable. To do so, barriers related to (a) concerns about time, (b) planning issues, and (c) financial concerns should be decreased or eliminated, in order to increase perceptions of four of the five characteristics of eXtension. Special consideration should be given to addressing financial concerns, due to its influence on perceptions of multiple characteristics.

Research is recommended to understand the influence of (a) concerns about time and financial concerns on perceived relative advantage, (b) financial concerns and planning issues on perceived compatibility, (c) financial concerns on perceived complexity, and (d) financial concerns on perceived trialability. Future studies should examine how the relationships between perceptions of eXtension and the barriers to eXtension differ according to social system. This study should be replicated in states other than Texas to better understand the factors related to the diffusion of eXtension throughout the entire Cooperative Extension system.

References

Accenture. (2003, November). *e-Extension pre-select business case*. Washington, DC: U.S. Department of Agriculture.

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INFLUENCES ON FLORIDA AGRICULTURAL EXTENSION AGENTS' DECISIONS TO REMAIN IN THE EXTENSION ORGANIZATION

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Abstract

This qualitative study sought to explore and describe the career decisions of Florida agricultural extension agents. Interviews were used to investigate the factors and experiences that affected agents' decisions to remain in extension. Both positive and negative influences were explored. A purposive sample was used to select twelve agents who worked primarily in commercial agriculture. They were identified by a panel of experts as having a dependable and respectable work reputation, and then classified into the career stages model (Kutilek, et al., 2002). Agents participated in an in-depth interview to share their thoughts on influences that shaped their decision to remain employed.

Grounded theory was used as the primary data analysis method (Strauss & Corbin, 1998). From the transcribed data, categories emerged specific to influential factors and experiences regarding participants' career decisions. The systematic process of coding was used to separate, sort, and analyze the data. Open, axial, and selective coding procedures were applied to extract meaning from the text. The constant comparison technique was also employed to identify similarities and differences of patterns found in the data. The selective codes comprised the final categories relative to the research objectives and were used to create a grounded theory.

Seven selective categories emerged as the most influential factors and experiences that affected participants' decisions to stay in an extension career. The categories were internal satisfaction, community leadership, external motivators, career benefits, change agents, network of support, and extension work environment. A concept map was created to delineate the relationships between the codes and a grounded theory was developed to explain the most significant issues and influences.

Introduction

The foundation of educational organizations is in its human and intellectual capital. Retention of employees is one of the top internal challenges currently facing the Cooperative Extension System (ECOP, 2005). This issue must be openly addressed in order for extension to continue its public services and programs. For extension to survive in this increasingly competitive world, it must prepare its faculty to grow, adapt, and thrive in a changing environment. Long-term employment is the most important factor inhibiting the "agility and flexibility" of an extension organization (ECOP, 2002). According to ECOP (2005), low salaries, staff cuts, downsizing, and aging faculty are causing agents to leave extension. Extension administrators must critically examine and employ competent staff for long-term survival. Developing hiring, compensation, and professional development strategies to retain qualified employees in today's global society is a key component for the future of extension.

Retention of agents is becoming increasingly problematic in many extension systems. High quality agents are leaving the extension system due to organizational factors, non-work related factors, and individual related factors (Kutilek, Gunderson, & Conklin, 2002). The national extension organization must consider these factors and how to best address them. The

beginning years within extension can shape the agents' attitudes, behaviors, and practices important for the future (Bailey, 2005). Yet, it is important that agents are not forgotten once employed. Faced with numerous career related issues, agents' needs can be met through professional development, in-service training, and targeted programs. Continual assistance for professional needs must be available to maximize agents' career potential. Knowing the needs of agents at various stages within their careers is essential to determining accurate proactive assistance, motivators, and organizational strategies (Kutilek, et al., 2002). Appropriate professional development opportunities can then be created to help reduce attrition rates and retain quality professionals.

The Florida Cooperative Extension System is currently facing the growing problem of agent turnover and burnout. To address these problems, the organization must understand the factors and influences that affect agents during their careers. Exploring agents' experiences can identify issues and concerns that affect significant career decisions. Proactive attention by the organization that addresses these concerns will help to retain agents in an increasingly competitive marketplace. These issues indicate a prominent need to further examine factors that affect extension agents' decisions to remain in the organization.

Theoretical/Conceptual Framework

Continual learning is vital for agents to be educated on the rapidly changing industry, improve work and life management skills, and perform effectively in their positions (Martin, 1991). New agents specifically need to be educated to successfully transition into the organization in order to remain long-term employees (Bailey, 2005). However, determining career needs is difficult in extension which encompasses a variety of job responsibilities, including conducting programs, developing educational materials, providing community support, and serving as a subject matter resource (Conklin, Hook, Kelbaugh, & Nieto, 2002).

A variety of career development models has assisted in understanding the needs of professionals. Dalton, Thompson, and Price (1977) created the original model for professional career stages which was adapted by Rennekamp and Nall (1994). Using Rennekamp and Nall's career stage model as a framework, Kutilek, et al. (2002) later adapted the model to create a "systems approach to maximize individual career potential and organizational success." This model is also divided into separate stages that coincide with an employee's career growth and development. The model consists of three stages in a person's career- the entry stage, colleague stage, and the counselor/advisor stage. In addition, it outlines motivators and organizational strategies that are beneficial at each stage. The model takes into consideration the prior career experiences of individuals and differing organizational career paths that can affect progression through the stages (Kutilek, et al., 2002).

The career stages model outlines appropriate motivators for employees based upon the stage and recommends organizational professional development strategies to address career needs (Kutilek, et al., 2002). The motivators provide the drive for participating in and the criteria for selecting among various professional development opportunities. The organizational strategies focus on relevant professional development opportunities for employees within each career stage (Rennekamp & Nall, 1993). Each stage has different motivators and as a result, separate career development programs must be tailored for every level. This approach addresses

both individual and organizational career development needs specific to employees within each stage. Utilizing the most effective career development methods can provide relevant career strategies that can facilitate employee growth. Table 1 outlines the stages, motivators and organizational strategies of this model.

Table 1. *Career Development Model for the Stages of Extension Agents* (Kutilek, et al., 2002)

Career Stage	Motivators	Organizational Strategies
Entry Stage	Understanding the organization, structure, and culture Obtaining essential skills to perform job Establishing linkages with internal partners Exercising creativity and initiative Moving from dependence to independence	Peer mentoring program Professional support teams Leadership coaching Orientation/job training
Colleague Stage	Developing an area of expertise Professional development funding Becoming an independent contributor in problem resolution Gaining membership and identity in professional community Expanding creativity and innovation Moving from independence to interdependence	In-service education Specialization funds Professional association involvement Formal educational training Service on committees or special assignments
Counselor and Advisor Stages	Acquiring a broad-based expertise Attaining leadership positions Engaging in organizational problem solving Counseling/coaching other professionals Facilitating self renewal Achieving a position of influence and stimulating thought in others	Life and career renewal retreats Mentoring and trainer agent roles Assessment center for leadership Organizational sounding boards

Purpose and Objectives

The purpose of this study was to explore and describe the career decisions of agricultural extension agents. Agricultural agents were selected due to the importance of agriculture in Florida and the perceived increasing rates of agent turnover prevalent in the Florida Cooperative Extension System. The interview process was used to investigate factors that influenced agents'

decision to remain in extension. From the data collected, a grounded theory was developed to explain the most significant issues. The key objectives of this study included:

- Objective 1: To understand the factors and experiences that influence Florida agricultural extension agents to remain in the organization

- Objective 2: To develop a grounded theory that explains the most significant issues that affect Florida agricultural extension agents' decisions to remain in the organization

Procedures

Participant Selection

A comprehensive list of Florida Cooperative Extension agents was used to establish the population of commercial agricultural agents. As determined by the researcher, the following program areas were defined as commercial agriculture: agronomy, horticulture, livestock, agriculture and natural resources, pest management, agronomic crops, citrus, dairy, vegetables, small farms, fruit crops, agricultural development, agricultural safety, farm management, and rural agribusiness development. One-hundred and eight agricultural agents were identified as eligible participants for the study. The researcher then requested further data on the percentage appointment specifically in agricultural programs, county, gender, contact information, and years of employment in extension.

The researcher used the information and a panel of experts to determine the sample. First, all participants must be currently employed extension agents that have at least an 80% appointment in commercial agriculture as designated in their job responsibilities. A panel of experts was consulted to narrow the sample further. These experts were chosen because of their familiarity and regular interaction with the agents. In a scheduled group meeting, the researcher requested their assistance in selecting dependable and respectable agents. This status was determined through personal interactions, positive performance evaluations, career achievements, and professional reputations. Thirty agents were identified by consensus from the panel and constituted the sample.

The panel of experts classified the 30 agents into one of the three categories from the career stages model- entry, colleague, and counselor/advisor- according to a list of defining characteristics compiled from three career stage models (Kutilek, et al., 2002; Dalton, et al., 1977; Rennekamp & Nall, 1994). The 30 agents were then further divided by the researcher and an extension professor to select the final interview participants. A purposive sample based on aforementioned researcher-imposed criteria was used to select a total of twelve agents, four in each category of the career stages model, as the final participants. To assist in transferability, dependability and credibility of findings, the participants represented different educational levels, ethnicities, commercial agricultural areas, ages, and years of employment. Additionally, male and female participants represented twelve separate counties and all five district regions throughout the state. This process helped to ensure the interview participants were as equally distributed as possible among to the study population in these particular areas.

Data Collection

The selected interview participants were initially contacted via email to explain the purpose and importance of the study, the value of their participation, and the data collection procedure. Upon agreement to participate, the researcher arranged interview times and dates on the telephone with each agent. The researcher sent a pre-interview questionnaire to participants one week prior to the scheduled interview date in order to gain demographic and background information beforehand, facilitate the interview process, and build rapport with participants. The interview questions were also included in the e-mail to encourage participants to reflect prior to the interview.

The researcher collected data from participants in twelve different counties representing all five districts within the state of Florida. The researcher traveled over 2000 miles to conduct face-to-face interviews. Prior to each interview, the researcher spent time with the agents to learn about the county, clientele, and extension programs, and gain an understanding of their personal and professional backgrounds. Having an understanding of work interests and duties was critical for the researcher to build a relationship and rapport with participants, and it conditioned the environment for open and honest dialogue during the interview.

A semi-structured interview format was used to organize the process which allowed for more freedom and exploration during the interview sessions (Hatch, 2002). At each agent's office, sixty to ninety minute interviews were conducted and audio-recorded. An informed consent form was signed by each participant prior to the interview process. During and after each interview, researcher field notes and memos were recorded which included key points, impressions, and observations from the interview. The researcher also ensured that the participant understood that future contact and discussion would be needed for clarification purposes and informed them of the member-checking process (Hatch, 2002).

Data Analysis

Grounded theory by Strauss and Corbin (1998) was the primary data analysis procedure used due to its focus of how meaning making advances the understanding of personal perspectives and insight. This method allows for the establishment of a close connection between the data collection, analysis, and resulting theory, and encourages the researcher to create a conceptual understanding of concrete realities that were expressed during the interviews (Strauss & Corbin, 1998; Charmaz, 2003). Grounded theory strategies including concurrent data analysis and collection, a specific data coding process, constant comparisons, refinement of emerging ideas, and integration of theory were implemented and applied to form the foundation of the analysis (Charmaz, 2003).

Each interview was transcribed verbatim and analyzed. Approximately 90% of the interviews consisted of the participants' responses generated through expansive questioning and probing from the researcher. Re-reading the interviews and listening to the tapes several times provided additional steps to identify possible misinterpretations, cross-check statements, and increase credibility and trustworthiness. Field notes were clarified and final comments were added to the transcription. To address credibility, trustworthiness, and confirmability, the researcher asked each participant to review the transcript of their interview to ensure that the

responses were accurately recorded. This review process is commonly termed the member checking process (Hatch, 2002).

To study the data, the researcher separated, sorted, and synthesized the data using open, axial, and selective qualitative coding procedures. Coding offers structure for the researcher to link data with information, topics, concepts, and themes. This process assists in focusing, organizing, and conceptualizing the data to develop categories and ideas (Morse & Richards, 2000). Open and axial coding was initially performed to identify general themes within and between the participants' responses. Once the links between axial codes established clear concepts, selective codes were created to contextualize the data (Strauss & Corbin, 1990). The synthesized selective codes were used as a basis for the grounded theory. To explain the findings, interpretations of participants' responses were supported with direct quotes and utilized to construct a grounded theory representative of the emergent selective codes (Glaser & Strauss, 1967).

Findings

The selective categories relevant to agents' decisions to remain in the organization were internal satisfaction, community leadership, external motivators, career benefits, change agents, network of support, and extension work environment. All of these categories emerged as influential factors and experiences that affected participants' decisions to remain in an extension career. Findings from each category are detailed below.

Internal Satisfaction

Encouraging feedback received about work performance and personal satisfaction gained from work experiences provided motivation to remain in the organization. Positive feedback from clientele, peers, and supervisors were the most important factors of internal satisfaction. Samantha expressed, "The most satisfying is your clientele. When you help them with a problem or solution… and then they tell you, we couldn't have done it without you and we appreciate it." Participants also regarded internal pride gained through work performance and clientele interaction as emotionally fulfilling. Brenda commented on her personal satisfaction, "It's the fact that people appreciate what we do for them and that's really satisfying." However, participants realize that clientele feedback can be limited without follow-up on results.

Community Leadership

The desire to work with a variety of public audiences, promote agricultural awareness, and meet clientele needs through education influenced participants' decisions. Each agreed that building and maintaining community relations was a significant factor affecting their work progress. They welcomed the integration into the community and the feeling of acceptance gained from that recognition. Matt was proud to be a member of the community and the dignity associated with his job, "It's nice to be recognized in the community as a kind of a community leader… part of the community. You're not just somebody who's working an eight to five job and you go home and you're a nobody."

Career Benefits

Influential career benefits included professional development, position benefits, and university resources. Higher education coursework, in-service trainings, and leadership

workshops were all contributing experiences to agents' career growth. However, four participants said that some professional development opportunities often interrupted their work responsibilities. Participants acknowledged the advantages of the fringe benefits associated with being an extension employee, including salary, opportunities for advancement, flexible work hours, and vacation time. Finally, accessibility to university specialists and resources enabled all agents to function effectively in their positions. Sean uses specialists to obtain current research information, "One of the things that has helped me the most is those extension specialists that I work with… that's where I get the university information to share with the producers… so that's been a really big organizational help to me, all of those specialists."

External Motivators

External motivation from performance indicators and rewards had a positive effect on participants' career decisions. Program participation, client loyalty, and positive evaluation results were considered reliable indicators of work performance. Tammy receives encouraging feedback through program evaluations when she "gives the people a survey and they've all been very positive. They want more education, they want me to come out and do farm visits, and they give me suggestions for new programs or new ideas." Participants also value the financial incentives, promotions, and awards received as a measure of professional success; however, peer nominations and recognition were the most significant awards. Samantha was appreciative of the opportunities to attend leadership conferences, complete her Master's degree, and receive "some promotions along the way and little incentives from the university which have been good."

Change Agents

The ability to affect societal change was a priority for participants. However, each acknowledged the necessity of a long-term commitment to clientele and work responsibilities in order to see results. The majority of participants regarded themselves as "change agents" and discussed several experiences concerning change in extension. Internal reinforcement of success was primarily based upon the creation of independent learners and changes seen in client behaviors. Harry's internal reinforcement of success is based upon behavior changes seen over the years in client practices,

> I see changes as a result of what we've been doing…there's things that you can visibly see the impact that you're making. So I would say the measure of success would be for me related to what's it mean to the people I'm working with for the most part. I'm seeing things that we're working on, I'm seeing them change, I'm seeing them adopt practices and learn how to do it themselves and then not needing me other than maybe just a little bit of help along the way to continually guide them.

Network of support

Having a network of support directly related to participants' level of job satisfaction. Support at all levels was needed, but emphasis was placed on clientele and organizational relationships, specifically administrators, specialists, and office staff. Teamwork activities with colleagues were regarded by all participants as a primary factor of success. Teams provided a source of support for programming, cooperative projects, experiential learning, and establishment as an agent. Samantha attributed her professional success to "working with a group of agents, I think it's good to have some collaborative effort with other agents because if you're out here by yourself, you can sink or swim pretty quick."

Extension Work Environment

The freedom and variety in extension work was referred to by all of the participants as a determining factor to remain in the organization. The daily variety of environments, situations, clientele, and activities were valuable features to the job. Participants described extension as unique because it offers the opportunity to use "their own talents" and improve upon them even though they may be different from others. Matt explained, "You can both do the same job and do it well and do it differently. There is no magic formula." The flexible nature of scheduling and making decisions gives participants the freedom to structure programs around client needs. The absence of micromanagement and job independence were additional characteristics valued by participants as Matt stated, "There's nobody who stands over your shoulder and tells you, you're going to do this today."

Conclusions/Grounded Theory

The influential factors and experiences that affected participants' decision to remain in the extension organization are represented in Figure 1. Participants received internal satisfaction from positive feedback and emotional fulfillment from extension work. External motivators consisted of measurable performance indicators and rewards received for work accomplishments. Career benefits consisted of professional development, position benefits, and university resources that provided valuable career assistance. Network of support focused on supportive relationships and teamwork activities that were beneficial to participants' work responsibilities. The extension work environment included freedom and variety in the job and characteristics of extension work as positive influences. Community leadership focused on the positive experiences in public relations and expert community recognition. The ability to serve as a change agent and affect societal change was also a positive factor.

Recommendations

Previous qualitative research in the area of career decisions of extension agents is limited. This study uncovered specific variables beneficial to understanding Florida agricultural extension agents' career decisions. Additionally, previous studies on job satisfaction and dissatisfaction tend to concentrate on people who have left extension rather than those who are currently employed. Future research must be conducted to discover the influences on current agents, so the organization can take a proactive approach to meet their career needs and retain highly qualified agents. A mixture of quantitative and qualitative research can offer mutually supportive information, so each must be utilized to verify and expand findings.

While this study provided worthwhile information about reasons for remaining in the organization from the twelve participants in the study, this research must be expanded to include all agricultural extension agents. It is important to explore the career decisions of the entire population of agricultural extension agents in Florida and throughout the United States to discover similarities and differences. It would also be beneficial to conduct research with international extension agents, particularly those with similar agricultural clientele and work responsibilities. Finally, this study could be expanded to include agents from other program areas, such as community development, 4-H, and family and consumer sciences, to discover the factors and experiences that have influenced their career decisions.

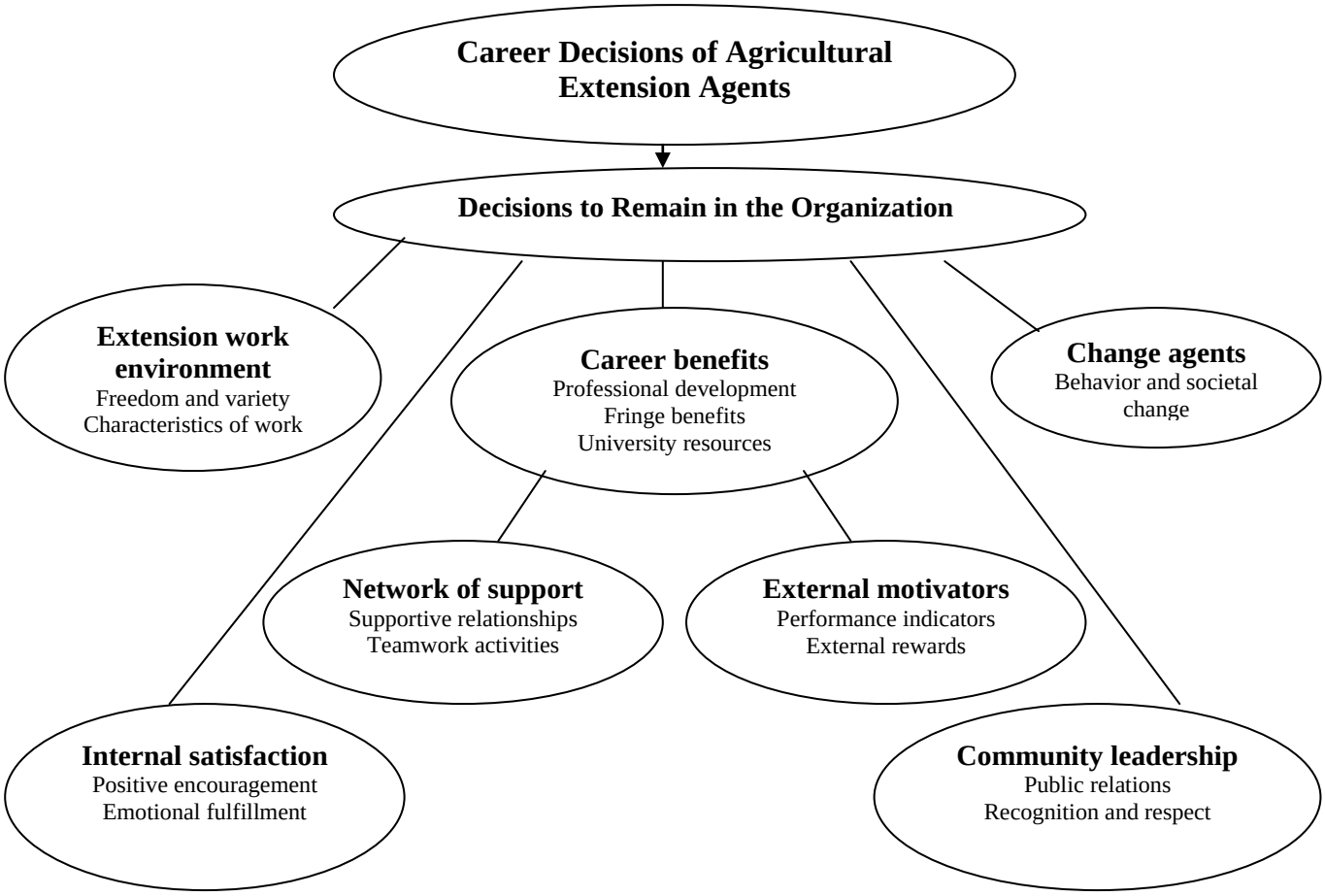

Figure 1. Grounded Theory of the Career Decisions of Florida Agricultural Extension Agents to Remain in the Extension Organization

Longitudinal studies focused on the career decisions of extension agents should be designed. These studies can be beneficial to discover changes in agents' attitudes and needs over the course of their careers. It is important that researchers continually develop this area of research and discover how changes in society, clientele, technology, and agriculture affect agents' career needs. A longitudinal study of the participants in this study should also be conducted as follow-up research.

Research on the retention, turnover, and organizational costs must be conducted on the Florida Cooperative Extension System and nationally by the USDA Cooperative State Research, Education, and Extension Service. Although recruitment and retention of agents is commonly identified as a problem by administrators, there is currently a lack of verifiable, statistical information available. Having these data will not only clearly identify the issues, but can provide evidence to support additional funding requests for career and professional development of extension agents.

Extension administrators must continually monitor the work environment within extension to address the influences on agents' career decisions. Influential factors and experiences must first be identified and then serve as a starting point to assess the quality of the work atmosphere. These influences should also be considered by county and district directors as essential elements for success. To improve career satisfaction and longevity, administrators and directors must ensure agents' needs are being met in the workplace and achievements are being made in specific identified areas. This can be accomplished through supervisor participation in programs, active involvement with agents' career development, and informal and formal evaluations.

Finally, the importance of social relationships emerged as the primary factor that affected participants' decisions to remain in extension. Connections with extension agents and specialists, peers, mentors, clientele, administrators, and advisors were critical to career satisfaction and longevity. Positive encouragement and feedback served as the driving factor for internal satisfaction. Collaborative teams offered significant personal and professional assistance to accomplish work responsibilities. These networks played an important role in motivating agents and provided necessary physical, emotional, and mental support that assisted in career success. This area of research should become a priority to identify personal connections that agents have made before entering extension and those that have remained influential during employment. Emphasis should be placed on discovering the types of personal connections that are most significant and why to aid in understanding the roles of relationships on career satisfaction. Additionally, opportunities for agents to build and maintain working relationships were important for participants' career growth. Research on the effects of teamwork, agent groups, collaborative programming, and social networks should be investigated to discover their career impacts. Having an understanding of the effects of social relationships can ultimately assist in organizational recruitment, retention strategies, and career development programs.

Discussion/Implications

Given the current problems with the availability of qualified applicants for agricultural agent positions mentioned by study participants, quality is frequently overlooked in order to fill the vacant position. However, as Matt mentioned, "Sometimes it might be best to start over." Filling vacancies with unqualified agents whose talents and skills do not match community needs can be detrimental to the employee and the organization. Positions must be filled with competent agents who are committed to long-term employment.

The organization must work to meet the needs of its employees and provide the necessary career support. The organization should continue to provide supplemental resources, continuing education, financial incentives, and professional development for all agents. University professional development extension specialists must be specifically assigned to design appropriate career development opportunities, maintain relationships with agents beyond orientation, and collaborate with agents in the field to improve career satisfaction. In addition, two-way communication between university subject matter specialists and extension agents must remain a priority. Current research must be disseminated from the university to extension agents in a timely manner in order to solve client problems. It is also important for specialists to maintain regular contact with county offices to assist agents in their job responsibilities.

Extension administrators and directors should be knowledgeable about career development models to raise awareness of what agents are experiencing at different career stages. This information can be useful to gauge the progress of agents and serve as an educational resource on career planning. The motivators and organizational strategies of the career stages model, as well as findings from this study, can offer a useful starting point for creating and staffing professional development programs. Results of this study indicate that if agents are motivated and supplied with appropriate career development, then they will have greater job satisfaction and retention.

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Extension Agents' Educational Preferences for Learning about Conservation Tillage Systems

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Abstract

The continuous food supply depends on the ability of agricultural systems to conserve the farmlands through environmentally-friendly practices such as conservation tillage. Conservation tillage means use of different tillage and planting systems to maintain crop residue to cover at least 30 percent of the soil surface for soil and water conservation. The effective and efficient transmission of conservation tillage information from Extension to farmers depends on Extension agents' access to educational materials and training about conservation tillage practices. According to andragogy, adults seek information that meets their learning needs. Therefore, it is important to understand Extension agents' educational preferences to help them learn about conservation tillage systems. This survey research was conducted with all agricultural Extension agents in Georgia to identify their educational information preferences for learning about conservation tillage systems. The study received a 62.9% response rate. Early and late responses were compared and found no statistically significant difference between the early and late respondents. This confirmed that findings can be generalized for the target population. The study population consisted of an experienced group of Extension agents; with the majority having graduate level education. State Extension Specialists and fellow Agents were the preferred sources of information for learning about conservation tillage systems.

Introduction - Theoretical Framework

Conventional agriculture is widely criticized for its adverse environmental and socioeconomic impacts (Bultena, 1991, p. 51). Research by McNairn and Mitchell (1992) indicated that soil erosion reduces Canadian farm income by more than 1 billion Canadian dollars per year. Handler (1970) estimated that 100 million acres of US farmland had been severely degraded and abandoned and soil erosion continues to be a problem in many parts of the US. With increasing world populations and new demand for bio-fuel production, pressure is increasing on farmland. It is doubtful we can meet these challenges if agricultural systems are not based on the principles of sustainability (Hamilton, 1999). The continuous food supply and energy depends on the ability of agricultural systems to conserve the farmlands through environmentally-friendly practices such as conservation tillage systems.

"Conservation tillage (CT) is one of many conservation practices developed to reduce soil erosion (Uri, 1999, p.1)." This technology is defined as "any tillage and planting system that maintains at least 30 percent of the soil surface by residue after planting to reduce soil erosion by water (Uri, 1999, p.7). "Conservation tillage results in less soil disturbance than traditional cultivation, reducing soil loss and energy use while maintaining crop yields and quality (Ohio Farm Bureau, 2005, para. 30)." In the United States, 41% or 113 million acres of cropland was under conservation tillage in 2004 (CTIC, 2006). Although the biggest area under no-tillage (a

from of conservation tillage system) is found in the U.S., in this country the technology is applied only on 16.3% of the total cultivated area, compared to 21% in Brazil, 32% in Argentina and 52% in Paraguay (Derpsch, 2005).

"The link between research and reality is still a tenuous one" (Gamon, Harrold, & Creswell, 1994, p. 38). This statement indicates the need for establishing communication linkages between research and Extension for effective diffusion of technology. "Cooperative Extension has historically played a major role in bringing information to farmers. However, the increasingly plurality and diversity of farming systems have been challenging its capacity to respond effectively in emergent farming systems grounded in agro-ecological principles" (Kroma, 2006, p.22). It is clear that further diffusion of conservation tillage practices depends on the efficiency and the effectiveness of transmitting conservation tillage technology from research to farmers through the extension service. The effective and efficient transmission of research based information to farmers depends on the Extension agents' access to educational materials and training about conservation tillage practices. Understanding Extension agents' educational preferences for learning about conservation tillage systems is important to equip them with necessary knowledge and skills to effectively educate farmers on conservation tillage practices.

The theoretical framework for this study is mainly based on Malcolm Knowles' adult education theory. Malcolm Knowles' (1990) andragogy supports the notion that adults seek information that meets their learning needs. The andragogical model of teaching involves choosing the problem areas that have been identified by the adult learners through self-diagnostic procedures and selecting appropriate education methods for learning (Knowles, 1990). Adults such as farmers are more sensitive to select the educational programs and materials matched with their learning needs (Karbasioun, Mulder, & Biemans, 2007). Adults are self motivated learners and learn efficiently when teaching methods and resources are matched with their educational needs and preferences. Identification of Extension agents' preferred educational methods and materials is significant for facilitating their learning about conservation tillage systems. Therefore, the focus of this study was to use the Knowles' theory of adult learning to understand what educational methods and materials that Extension Agents prefer in learning about conservation tillage systems.

Purpose and Objectives

The purpose of this study was to identify Extension Agents' educational information preferences for learning about conservation tillage systems. More specifically the study addresses the following research questions.

1. What are the Extension agents' preferred sources of information for learning about conservation tillage systems?
2. What are the Extension agents' preferred methods of training for learning about conservation tillage systems?
3. What are the Extension agents' preferred types of educational materials for learning about conservation tillage systems?
4. Is there any preferential difference between more experienced Extension agents and less experienced Extension agents over the sources of information, methods of training, and types of educational materials for learning about conservation tillage systems?

Methods and Procedures

Population and Sample

This was a descriptive survey research study. The target population for this study included all agricultural and natural resource (ANR) Extension agents in Georgia. The list of ANR Extension agents received from the University of Georgia Cooperative Extension was used as the population frame. There were 151 agricultural extension agents in the study population and all of them were surveyed. This study was done as a part of a large project of conservation tillage training needs assessment.

Instrumentation

The survey questionnaire was designed by the research team and included three major sections to identify Extension agents' preferred sources of information, methods of learning, and types of educational resource materials for learning about conservation tillage systems. The first section included a list of common sources of information that Extension agents might use for learning about conservation tillage systems. The agents were asked to identify sources of information by using (5) for the most preferred and (1) for the least preferred source on a Likert type scale. Additionally, respondents were asked to list any important sources of information not in the prepared listing and identify the preferences of their additional sources. The second section of the instrument was designed to identify the Extension agents' preferred methods of training for learning about conservation tillage systems. Commonly used methods of training were listed and agents were asked to identify the methods; using (3) for the most preferred and (1) for the least preferred method. The third section of the survey instrument was designed to identify Extension agents' preferred types of educational resources for learning about conservation tillage. The common types of educational resources were listed and agents were asked to identify the sources using (3) for the most preferred and (1) for the least preferred learning resource type. Additionally, demographic variables such as extension agents' years of extension service and highest academic qualification were recorded.

The content validity of the survey instrument was determined by a panel of experts in agricultural Extension and conservation tillage systems. The survey instrument was pilot tested with 12 agricultural Extension agents to establish face validity and reliability of the instrument.

Data Collection and Analysis

Data were collected via e-mail system. The survey was e-mailed as an attached Microsoft® Word document with the cover letter to the target population. They were asked to print the survey, respond, and mail in their responses to preserve their anonymity, which assured the target population could respond without any concerns. The study received 82 responses during the first e-mail of the survey. A reminding e-mail was sent to the target population three weeks after the initial e-mailing of the survey. This e-mail generated an additional 13 responses. Of the total population of 151 agricultural extension agents in Georgia, 95 responded to the survey comprising a 62.9% response rate. Early and late responses were compared to address the non-response issue as Miller and Smith explained in their study (1983). The comparison indicated

that there was no statistically significant difference between the early and late respondents. This confirms that the findings can be generalized for the target population.

Data analysis was conducted using SPSS® software package. Descriptive statistics such as percentages, means, and weighted means were used to summarize findings. The weighted mean was calculated to identify the order of Extension agents' learning preferences. Since this was a population study, significance tests were not conducted.

Results and Findings

Respondents' years of experience ranged from one to 29 years with the mean of 17.3 years in Extension. Of the respondents, 63% had a master's degree, 1% had a doctoral degree and 35% had a bachelor's degree.

Information Source Preferences for Learning about Conservation Tillage

Data revealed the Extension agents' most preferred source of information for learning about conservation tillage was state Extension specialists. The second most preferred source of information was fellow Extension agents. The Natural Resource and Conservation Service was identified as the third most preferred sources of information. The Georgia Conservation Tillage Alliance (a farmer grass-root organization) was the fourth most preferred source of information. The Agricultural Research Service was the fifth most preferred sources of information. Even though the Internet is becoming the most popular source of information it was identified as the sixth preferred sources of information for learning about conservation tillage. Trade magazines were the seventh most preferred sources of information. The least preferred source of information was fertilizer or chemical industries as indicated in Table 1.

Some Extension agents identified farmers with previous conservation tillage experience as a preferred source of information as indicated by the fairly high mean value. However, only a small number of Extension agents identified this source of information by responding to the open-ended question category in the instrument, resulting in a low weighted mean.

The comparison of preferences for information sources between more experienced (11 years or more service) Extension agents and less experienced (10 years or less service) Extension agents revealed that there is a slight difference between two groups as summarized in Table 2. Less experienced Extension agents preferred Agricultural Research Service, the internet, experts outside the state, Farmers with previous conservation tillage experience, and fertilizer or chemical industries as sources of information for learning about conservation tillage systems compared to more experienced Extension agents. Contrast to the preferences of less experienced Extension agents, more experienced Extension agents preferred state Extension specialists, fellow Extension agents, Natural Resource and Conservation Service, and trade magazines as the sources of information about conservation tillage systems.

Table 1.
Extension Agents' Preferred Sources of Information for Learning about Conservation Tillage Systems.
(5 being the most preferred source and 1 being the least preferred source of information)

Source of Information	N	Mean	Weighted Mean (N X M)
1. State Extension Specialists	83	3.59	298.0
2. Fellow Extension Agents	70	3.36	235.2
3. Natural Resource and Conservation Service	65	3.03	197.0
4. Georgia Conservation Tillage Alliance (grass roots organization)	44	2.61	114.8
5. Agriculture Research Service	43	2.60	111.8
6. Internet	36	2.67	96.1
7. Trade Magazines	27	2.56	69.1
8. Experts outside of the state	25	2.56	64.0
9. Fertilizer or chemical industries	20	2.00	40.0
10. Farmers with previous CT experience	13	3.08	40.0

Preferred Methods of Training for Learning about Conservation Tillage

Classroom training combined with hands- on infield training was identified as the most preferred method of learning about conservation tillage systems. This was followed by infield training, classroom training, and distance education programs respectively. The distance education was identified as the least preferred method of learning about conservation tillage systems as indicated in Table 3.

Table 2.
Comparison of the Information Source Preferences of Less Experienced and More Experienced Extension Agents.

	10 Years or Less Experienced		11Years or More Experienced	
Source of Information	**N**	**Mean**	**N**	**Mean**
1. State Extension Specialists	21	3.33	58	3.66
2. Fellow Extension Agents	19	3.16	47	3.45
3. Natural Resource and Conservation Service	16	2.75	46	3.11
4. Conservation Tillage Alliance	11	2.64	32	2.63
5. Agriculture Research Service	9	3.11	32	2.47
6. Internet	12	3.67	22	2.09
7. Trade Magazines	6	2.17	20	2.70
8. Experts outside of the state	7	2.71	17	2.47
9. Fertilizer or chemical industries	5	2.20	14	1.71
10. Farmers with previous CT experience	4	3.25	9	3.00

Table 3.
Extension Agents' Preferred Methods of Learning about Conservation Tillage Systems.
(3 being the most preferred and 1 being the least preferred method of learning)

Method of Learning	**N**	**Mean**	**Weighted Mean**
1. Classroom training combined with infield training workshops	83	2.43	202
2. Infield training workshop on conservation tillage	81	2.16	175
3. Classroom training workshop on conservation tillage	69	1.55	107
4. Distance education programs	25	1.52	38

Results indicate that there was no wide difference between training method preferences of more experienced Extension agents versus less experienced Extension agents as summarized in Table 4.

Table 4.
Comparison of the Learning Method Preferences of Less Experienced and More Experienced Extension Agents.

	10 Years or Less Experienced		**11Years or More Experienced**	
Method of Learning	**N**	**Mean**	**N**	**Mean**
1. Classroom training combined with infield training workshops	19	2.58	60	2.40
2. Infield training workshops on conservation tillage	18	2.28	60	2.12
3. Classroom training workshops on conservation tillage	14	1.36	52	1.60
4. Distance education programs	5	1.20	18	1.61

Preferred Forms of Educational Materials for Learning about Conservation Tillage

Information in PDF format available on the Internet and printed materials were the most preferred types of educational materials for learning about conservation tillage systems. Information saved on a compact disc (CD) was considered the third preferred type of educational resource as indicated in Table 5.

Table 5.
Extension Agents' Preferred Types of Resource Materials for Learning About Conservation Tillage Systems.

(3 being the most preferred and 1 being the least preferred type of resource material)

Resource Materials	**N**	**Mean**	**Weighted Mean**
1. Information about conservation tillage (CT) in PDF format available on the Internet	86	2.08	179
2. Printed materials about CT.	85	2.06	175
3. Information about CT in electronic form saved on a CD	83	1.96	163

Preferences of educational resource type for learning about conservation tillage systems didn't change considerably between more experienced and less experienced Extension agents as indicated in Table 6.

Table 6.
Comparison of the Educational Resource Type Preferences of Less Experienced Versus More Experienced Extension Agents.

	10 Years or Less Experienced		11Years or More Experienced	
Method of Learning	**N**	**Mean**	**N**	**Mean**
1. Information about conservation tillage (CT) in PDF format available on the Internet	19	2.16	63	2.06
2. Printed materials about CT.	18	1.94	63	2.10
3. Information about CT in electronic form saved on a CD	17	2.06	62	1.94

Conclusions

The study population consisted of an experienced group of Extension agents; with the majority of them having graduate level education. State Extension Specialists and fellow Agents were the preferred sources of information for learning about conservation tillage systems. Experts outside of Georgia were not a preferred source of information. This ranking may be due to limited accessibility in reaching outside experts. State specialists and fellow Extension agents are easily accessible due to their work relationships. The Natural Resource and Conservation Service, the Georgia Conservation Tillage Alliance, and the Agricultural Research Service were the next most preferred sources of information. The Internet and trade magazines were the third most preferred sources of information and fertilizer or chemical industries' was the least preferred source.

There was an observable differences in preferences for sources of information between the more experienced versus less experienced agents. More experienced Extension agents preferred state specialists, fellow Extension agents, Natural Resource and Conservation Service, and trade magazines as sources of information about conservation tillage systems. Less experienced Extension agents preferred Agricultural Research Service, the internet, experts outside the state, Farmers with previous conservation tillage experience, and fertilizer or chemical industries as sources of information for learning about conservation tillage systems compared to more experienced Extension agents. The Internet was a more preferable source of information for the agents with 10 years or less experience in Extension. This indicates that the Internet is a potential source for delivering the information about conservation tillage systems to new Extension agents. It may also indicate that older agents need more training to become comfortable with this information source.

‘Classroom training combined with infield training workshops’ was the most preferred method of training for learning about conservation tillage. This may be due to the complementary effects of two training methods. The classroom method is normally helpful for teaching theoretical concepts while the infield trainings tend to be hands on and are helpful in teaching how to apply learned concepts. Extension agents preferred infield training over classroom training workshops alone in learning about conservation tillage systems. Distance education was not a preferred method of training for Extension agents to learn about conservation tillage systems. There was no clear preferential difference between more experienced Extension agents versus less experienced Extension agents over these training methods.

Information available in PDF format on the Internet was the most preferred type of educational resource material for Extension agents to learn about conservation tillage systems. Printed materials and information saved on a compact disc were the second and third most preferred types of educational materials, respectively, for learning about conservation tillage systems. There was no difference in preferences for these three types of educational materials shown for more experienced Extension agents versus less experienced Extension agents.

Recommendations

Based on the findings of this study, the following recommendations can be made to facilitate Extension agents’ educational process for learning about conservation tillage systems:

1. Dissemination of information targeting Extension agents about conservation tillage systems should be channeled through the state Extension Specialists. Building a network of Extension agents is helpful to facilitate lateral spread of information about conservation tillage systems from fellow Extension agents.
2. The Natural Resource and Conservation Service, The Georgia Conservation Tillage Alliance, and the Agriculture Research Service should be used to educate Extension agents about conservation tillage systems.
3. The potential of the Internet to educate Extension agents, especially new agents, should be more aggressively explored. Information about conservation tillage systems should be saved in PDF format and disseminated via the Internet in order to facilitate the learning process of Extension agents.
4. Training programs for educating Extension agents on conservation tillage systems should be designed to combine classroom with hands on infield training.

Further research is needed to identify how preferred sources of information, methods of training, and types of educational materials contribute to Extension agents’ learning outcomes.

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COOPERATING TEACHERS' PERCEPTIONS OF STUDENT TEACHERS' LEARNING GAPS IN FFA, LEADERSHIP DEVELOPMENT, SAE, AND PROGRAM MANAGEMENT

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Abstract

The purpose of this report, which was part of a larger study, was to determine, as witnessed by cooperating teachers, what learning gaps in FFA, SAE, and program management pre-service teachers brought to the student teaching experience. Cooperating teachers felt that the pre-service teachers needed assistance in the areas of FFA, public relations, preparing various award applications and developing SAE's for students. According to cooperating teachers, pre-service students also need assistance in embedding graduation standards into the curriculum, establishing an advisory committee, and completing state and local reports. Therefore, it was recommended that the learning gaps of the pre-service teachers be addressed by university faculty and state agricultural education staff.

Introduction

Continuous evaluation of the agriculture teacher education curriculum has identified some deficiencies in pre-service teachers' preparation for the student teaching and professional teaching experiences. Many states are currently revising their agricultural education curriculum as a result of changes in agricultural technology, new state and national standards, and the move to integrate more science and math into agriculture. When this happens, curriculum at the university level needs to be modified to address these changes to ensure that pre-service teachers are better prepared. Identifying learning gaps of pre-service teachers provides information as to how the agriculture teacher education materials should be re-evaluated.

Studies have been conducted to determine the needs of beginning and experienced agricultural education teachers. Edwards and Briers (2001) looked at the important elements of the student teaching experience through the eyes of the cooperating teacher, but no research was found that has looked at the needs of the pre-service teacher from their perspective. Joerger (2002) made recommendations that each new group of beginning teachers should be surveyed to find what their in-service needs are at that time because the different groups may have different needs. The Joerger study also recommended that the information regarding beginning teacher needs be shared with teacher educators, state staff, and others involved in pre-service and in-service teacher training.

Agricultural education teachers, especially new ones, face a variety of challenges. New agriculture teachers are responsible not only for classroom teaching duties, maintaining a laboratory, and supervising individual student's agricultural programs, but also for the success of the total agriculture program, including serving as FFA advisor. Many beginning, and even some experienced teachers lack the skills necessary to be successful in all of these areas. Some pre-service teachers never enrolled in an agriculture class or joined the FFA in high school, and may not be prepared to manage an entire agriculture program. Halford (1998) surmised that, "Given

comparisons to fields such as medicine and law, which recognize the needs of new professionals more fully, some observers have dubbed education as the profession that eats its young" (p. 34). "Indeed, the first three to five years of teaching are crucial in the development of competent and dedicated teachers. Many new teachers never recover from the initial experience of teaching agriculture, consequently they leave the profession" (Peiter, Terry, & Cartmell, 2003, p. 180).

"Researchers have argued that the student teaching 'experience' plays a significant role in the formation of attitudes and perceptions of pre-service teachers regarding their roles and responsibilities as future practitioners" (Harlin, Edwards, & Briers, 2002, p. 72). Edwards and Briers (2001) asked "Is there a more important component of the pre-service professional development…than the student teaching experience?" (p. 30). Many teachers often experience frustrations while teaching. However, these concerns and frustrations may be more intense during student teaching and the first year (Fritz & Miller, 2003). "Some examples of teaching concerns are: being supervised by the cooperating teacher or university supervisor, discipline problems, subject matter knowledge, and the learning process of students...non-teaching concerns included such topics as seeking employment, interviewing, and several other professional issues relating to the teaching environment" (Fritz & Miller, 2003, p. 49).

"Cooperating teacher evaluations of students provides meaningful information that is helpful in holistically evaluating student teachers" (Baker & Malle, 1995, p. 51-52). Cooperating teachers work with the pre-service teachers on a daily basis, give them advice, help them learn about the teaching process, and serve as a role model. Therefore, this study sought the knowledge and wisdom that the cooperating teachers held about the pre-service teachers' abilities.

Conceptual Framework

Research by many authors (Mundt & Conners, 1999; Ulrich, et al., 2002; Layfield & Dobbins, 2002; Garton & Chung, 1996; Peiter et al., 2003; Joerger, 2002; Edwards & Briers, 1999; Duncan et al., 2005; Roberts & Dyer, 2002; Greiman, and Walker & Birkenholz, 2002) has found that new teachers need assistance in the areas of FFA, leadership development, and SAE activities. "Over the years the National FFA Organization has consistently added new programs, award areas, and career development events. Perhaps the FFA is becoming too big for a beginning teacher to effectively manage" (Mundt & Conners, p. 47).

Ullrich, et al. (2002) found that the average FFA membership in programs with entry-year teachers was 62.4%. This was lower than programs that had more experienced teachers. "If extracurricular (FFA) activities are integral to student learning experiences, then a low membership percentage presents a unique problem for inexperienced teachers by creating additional stress and recruiting responsibilities to the teacher" (Ullrich, et al., p. 43).

Beginning teachers in several states are reported to require in-service training in the areas of preparing FFA degree applications and preparing proficiency awards (Layfield & Dobbins, 2002; Garton & Chung, 1996; Peiter et al., 2003; Joerger, 2002; Edwards & Briers, 1999; Duncan et al., 2005). In addition to needing assistance with filling out proficiency awards, beginning teachers need help "developing SAE opportunities for students" and "supervising

students' SAE programs" (Layfield & Dobbins, p. 49). Joerger found similar results in the 2001 cohort that he studied, and Dormody and Torres (2002) also discovered that developing SAE opportunities and supervising SAE programs were needed areas of improvement in new teachers. Garton and Chung and Duncan, et al. also found that there was a need for in-service in the area of developing SAE opportunities for students. In addition to managing SAE projects, experienced teachers needed in-service activities in teaching record keeping skills (Layfield & Dobbins).

Managing the overall activities of the FFA is a challenge faced by new teachers and an area where additional training is needed (Joerger, 2002: Garton & Chung, 1997). Managing FFA activities is also one of the characteristics of a good agricultural education teacher (Roberts & Dyer, 2002). Entry-phase teachers need assistance with preparing students for and succeeding in FFA career development events (Edwards & Briers, 1999; Mundt & Conners, 1999; Joerger). Roberts and Dyer discovered that an effective agriculture teacher prepares students for CDEs and other FFA activities. Many new teachers needed assistance with FFA officer elections (Greiman, et al., 2002). Organizing fundraisers (Layfield & Dobbins, 2002) and planning student and supporter awards programs, such as FFA banquets (Edwards & Briers) are additional areas in which new teachers need assistance. Duncan, et al. (2005) stated that teachers need training "establishing and organizing an agricultural co-op/internship" (p. 55).

Often, new agriculture teachers need assistance in dealing with the school faculty and members of the community. Mundt and Conners (1999) found that new teachers needed in-service training in "building the support of faculty, counselors, and administrators within the school system" (p. 41-42). Joerger (2002) discussed new teachers needing additional training with working with advisory committees, FFA Alumni, and Young Farmer organizations. Layfield and Dobbins found similar results in South Carolina with the experienced teacher needing training working with Young Farmer programs (2002). Duncan, et al. (2005) found that all teachers [in Georgia] need training using alumni and Young Farmer programs. Some studies have also identified developing an effective public relations program as an area needing additional training (Garton & Chung, 1996; Layfield& Dobbins, 2002; Duncan et al.).

Managing the total agricultural education program can be a daunting task. Many pre-service and beginning teachers are not prepared to complete tasks such as filling out reports, selecting courses and course materials, and working with other adults in the school and community. Beginning teachers often have many areas in which they need in-service training. Teachers in many studies felt that the area they needed the most in-service training was filling out local and state reports (Garton & Chung, 1996; Garton & Chung, 1997; Layfield & Dobbins, 2002). Joerger (2002) found that the 2000 cohort that was looked at needed training in completing reports, but the 2001 cohort did not. Embedding graduation standards in the agricultural education curriculum is essential for programs to be credible with administrators, yet many teachers need help in this area (Duncan, et al., 2005).

Many new teachers have difficulty working with other adults. The 2000 and 2001 cohorts of the study conducted by Joerger (2002) had similar in-service needs in the area of "establishment, maintenance and use of advisory committees" (p. 14). Beginning teachers felt they had more of a need to training with using advisory committees than did experienced

teachers in the Layfield and Dobbins study (2002). Garton and Chung found similar results in their 1996 study when the need for in-service training in the area of using an advisory committee ranked seventh with the beginning teachers and third with the joint staff. Roberts and Dyer (2002) found that one of the characteristics of an effective agriculture teacher is working with other teachers and administrators. Cooperating teachers feel that "a spirit of professional cooperation among fellow teachers" is an important element of the student teaching experience (Edwards & Briers, 2001, p. 37).

Previous research questioned pre-service, beginning, and experienced teachers about areas of agricultural education preparation programs that need improvement. This study reaches out to a new area of research, as it will address the cooperating teachers' perspective of the areas in which pre-service teachers need additional training, based on their work with the pre-service teachers on a daily basis.

Purpose and Objectives

The purpose of this report, which is part of a larger study, was to determine, as witnessed by cooperating teachers, what learning gaps in FFA, SAE, and program management pre-service teachers brought to the student teaching experience. Specifically, the following objectives guided this study:

1. Identify the areas of FFA/ leadership development/ SAE and program management that cooperating teachers perceive as important to the success of pre-service teachers;
2. Identify the strengths and weaknesses of pre-service teachers in areas of FFA/leadership development/SAE and program management as observed by cooperating teachers; and
3. Determine the areas of FFA/leadership development/SAE and program management in which the pre-service teachers may require future professional development, and in which the university agricultural education curriculum should be modified.

Methods

This study was conducted using descriptive design, and it incorporated survey research that asked participants to respond *ex post facto* (Campbell & Stanley, 1963) or after the fact. "Survey research studies large and small populations by selecting and studying samples … to discover the relative incidence, distribution, and interrelations of sociological and psychological variables" (Kerlinger, 1964, p. 410). "Ex post facto…research is systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable" (p. 379).

The independent variables studied were the gender of the cooperating teachers, number of years they have taught agricultural education, number of student teachers they have supervised, number of years since they have had a student teacher, how they were certified to become a teacher, their level of education, the number of students in their program, and how many other agriculture teachers are at the cooperating teacher's school. The dependent variables

of the study were the perceived levels of importance of the areas studied, the perceived competence of the pre-service teachers in the areas, and the areas of need that were calculated.

The population of this study included all agriculture cooperating teachers who were on the approved list of pre-service teacher sites in Georgia during the 2003-2004, 2004-2005, or 2005-2006 school years (N=52). Sampling techniques were not utilized since the total population was used. Of the 52 who were sent surveys, 44 responded, producing an 85% response rate.

The average participant was male and had taught for 17 years. The teachers had an average of three student teachers and the last time they had a student teacher was 2.12 years ago. The most common way the cooperating teachers were prepared to teach was through the traditional method, which was through an undergraduate teacher education program, graduate program of one year beyond the bachelors degree, or combined undergraduate and graduate program. The average level of education of the cooperating teachers in this study was a master's degree. The average enrollment of agriculture students at the cooperating teacher's school was 183 and there were an average of 2.26 agriculture teachers at each of the schools.

Surveys were mailed to the cooperating teachers in June (number of respondents = 27). A personal contact was made with the non-respondents at the Georgia Vocational Agriculture Teachers Association Summer Conference (number of respondents = 14). Next, a follow-up letter was sent in August, and another letter and survey mailed to the non-respondents in September (number of respondents = 3). Finally, an e-mail was sent to the non-respondents in October (number of respondents = 0). Of the 52 cooperating teachers that were sent surveys, 44 responded producing a response rate of 85%.

The instrument was modeled after the Joerger (2002) and Garton and Chung (1996/1997) survey instruments. Both of these surveys were based on the Borich Needs Assessment Model (Borich, 1980). The items on the instrument were constructed with two summated rating scales ranging from 1 to 5 that measured the cooperating teachers' perceptions of the importance of the competencies, as well as the pre-service teachers' level of competence in each of the competencies. Respectively, the scales were 1 = not important, 2 = of little importance, 3 = somewhat important, 4 = important, 5 = very important, and 1 = not competent, 2 = little competence, 3 = somewhat competent, 4 = competent, 5 = very competent.

The areas surveyed on the instrument for this section of the study were FFA/ leadership development/ SAE, and program management. A panel of experts consisting of university faculty, graduate students, regional coordinators of agricultural education, and agriculture teachers was used to determine the face and content validity of the instrument. After experts evaluated the instrument, several items were added to reflect agricultural education in Georgia. Because of space limitations, this study is part of a larger study, so only the constructs of FFA/leadership development/SAE and program management are detailed in the paper.

Data was entered into Excel and SPSS 12.0. Cronbach's alpha was calculated to determine the reliability of importance (α= .92, .87) and competence (α= .95, .89) scales for the FFA/ leadership development/ SAE and program management needs respectively. The importance and competence scores were calculated by averaging the responses of the

cooperating teachers for each competency. The mean weighted discrepancy score (MWDS) was determined by calculating a discrepancy score for each teacher for each competency by subtracting the competency score from the importance score. “A weighted discrepancy score was then calculated by multiplying the discrepancy score by the mean importance rating for each competency. A MWDS was calculated by taking the sum of the weighted discrepancy scores and dividing by the number of complete…responses for the competency” (Joerger, 2002, p. 13).

Findings

According to the cooperating teachers, the five most important FFA, leadership development, and SAE areas were conducting local FFA chapter activities, developing SAE opportunities for students, preparing agriculture/FFA career development events, supervising students' SAE programs, and developing an effective public relations program. The areas that ranked the least important were establishing and organizing agricultural co-ops and internships and developing a variety of curriculum-based school-to-work activities (Table 1).

Table 1
Importance Level of FFA/ leadership development/ SAE Areas

	f	*M*[1]	*SD*
Conducting local FFA chapter activities	42	4.81	.40
Developing SAE opportunities for students	42	4.74	.45
Preparing agriculture/FFA career development events	42	4.69	.52
Supervising students' SAE programs	42	4.64	.62
Developing an effective public relations program	42	4.62	.49
Planning banquets	42	4.52	.59
Integrating life skills into the curriculum	42	4.50	.71
Organizing fundraising activities for the local FFA chapter	42	4.48	.77
Teaching record keeping skills	42	4.40	.66
Preparing FFA degree applications	42	4.40	.70
Preparing proficiency award applications	42	4.40	.73
Coordinating activities with local ag organizations/agencies	42	4.31	.68
Providing guidance concerning post-secondary ed. in food, fiber, & natural resources	42	4.21	.90
Providing career exploration activities in food, fiber, & natural resources	42	4.21	.81
Teaching about public issues regarding agriculture	42	4.14	.72
Utilizing local FFA alumni or Young Farmer affiliate	42	4.10	.85
Developing a variety of curriculum-based school-to-work activities	42	3.69	.87
Establishing and organizing agricultural coops and internships	42	3.36	.96

Note. [1]Mean score from 1 to 5; 1 being not important and 5 being very important.

The five program management areas that the cooperating teachers felt were the most important were developing relations with fellow teachers and administrators, establishing a program advisory committee, determining the content that should be taught in specific courses, evaluating the local agriculture program, and completing reports for local and state administrators (Table 2). The areas that were viewed as the least important were conducting

needs assessments to determine the courses that should be taught and locating and selecting student references and materials.

Table 2
Importance Level of Program Management Areas

	f	*M*	*SD*
Developing relations with fellow teachers and administrators	43	4.44	.63
Establishing a program advisory committee	43	4.44	.63
Determining the content that should be taught in specific courses	43	4.40	.66
Evaluating the local agriculture program	43	4.35	.72
Completing reports for local and state administrators	43	4.30	.80
Embedding graduation standards into the agriculture curriculum	43	4.30	.89
Locating and selecting student references and materials	43	4.16	.65
Conducting needs assessments to determine the courses that should be taught	42	3.83	.76

After rating their perceived importance level of the different areas, the cooperating teachers rated the ability, or competencies, that they witnessed pre-service teachers demonstrate in the different areas. When the cooperating teachers were asked about the pre-service teachers' competence in FFA, leadership development, and SAE, the five areas in which the pre-service teachers demonstrated the most knowledge were conducting local FFA chapter activities; providing guidance to students concerning post-secondary education in the food, fiber, and natural resource industries; supervising students' SAE programs; integrating life skills into the curriculum; and preparing agriculture/FFA career development events. The areas in which the pre-service teachers had the least knowledge, according to cooperating teachers, were in establishing and organizing agricultural co-ops and internships and developing a variety of curriculum-based school-to-work activities (Table 3).

Table 3
Student Teacher Competence Level of FFA/ leadership development/ SAE Areas

	f	*M*	*SD*
Conducting local FFA chapter activities	36	3.58	.77
Providing guidance concerning post-secondary ed. in food, fiber, & natural resources	36	3.39	.87
Supervising students' SAE programs	36	3.31	.95
Integrating life skills into the curriculum	36	3.31	.92
Preparing agriculture/FFA career development events	36	3.28	.94
Providing career exploration activities in food, fiber, & natural resources	36	3.28	.85
Developing SAE opportunities for students	36	3.25	.81
Teaching about public issues regarding agriculture	36	3.20	.92
Coordinating activities with local ag organizations/agencies	36	3.14	.90
Developing an effective public relations program	36	3.03	.77
Organizing fundraising activities for the local FFA chapter	34	3.00	1.04
Teaching record keeping skills	36	2.97	.94
Planning banquets	36	2.94	1.01

Preparing FFA degree applications	36	2.83	.97
Utilizing local FFA alumni or Young Farmer affiliate	36	2.81	1.04
Preparing proficiency award applications	35	2.77	1.00
Developing a variety of curriculum-based school-to-work activities	35	2.63	1.03
Establishing and organizing agricultural coops and internships	35	2.49	.92

In program management, the study found that the pre-service teachers were the most competent in developing relations with fellow teachers and administrators, locating and selecting student references and materials, determining the content that should be taught in specific courses, and evaluating the local agriculture program. The pre-service teachers' weakest areas were embedding graduation standards into the agriculture curriculum and conducting needs assessments to determine the courses that should be taught (Table 4).

Table 4
Student Teacher Competence Level of Program Management Areas

	f	*M*	*SD*
Developing relations with fellow teachers and administrators	37	3.73	.69
Locating and selecting student references and materials	37	3.60	.76
Determining the content that should be taught in specific courses	37	3.46	.61
Evaluating the local agriculture program	36	3.25	.91
Completing reports for local and state administrators	37	3.19	1.08
Establishing a program advisory committee	37	3.05	.97
Conducting needs assessments to determine the courses that should be taught	36	3.00	.76
Embedding graduation standards into the agriculture curriculum	37	2.97	.87

The mean weighted discrepancy score (MWDS) determines the need of additional training for the pre-service teacher using the cooperating teachers' perceived importance and the pre-service teachers' competence in each area. In FFA, leadership development, and SAE, the areas in which the pre-service teachers need the most development were developing an effective public relations program, preparing proficiency award applications, developing SAE opportunities for students, planning banquets, and preparing FFA degree applications (Table 5). The areas in which the pre-service teachers were not viewed to need much assistance were establishing and organizing agricultural co-ops and internships and providing guidance to students concerning post secondary education in the food, fiber, and natural resource industries.

Table 5
FFA/Leadership Development/ SAE Needs of Pre-Service Agriculture Teachers

	MWDS[1]
Developing an effective public relations program	7.26
Preparing proficiency award applications	7.25
Developing SAE opportunities for students	7.18
Planning banquets	7.10
Preparing FFA degree applications	7.04

Teaching record keeping skills	6.79
Supervising students' SAE programs	6.63
Preparing agriculture/FFA career development events	6.58
Organizing fundraising activities for the local FFA chapter	6.24
Conducting local FFA chapter activities	5.91
Integrating life skills into the curriculum	5.66
Utilizing local FFA alumni or Young Farmer affiliate	5.62
Coordinating activities with local ag organizations/agencies	5.17
Providing career exploration activities in the food, fiber, & natural resources	4.09
Teaching about public issues regarding agriculture	4.02
Developing a variety of curriculum-based school-to-work activities	3.91
Providing guidance concerning post-secondary ed. in food, fiber, & natural resources	3.61
Establishing and organizing agricultural coops and internships	3.16

Note. [1]Mean Weighted Discrepancy Score.

When the researcher determined the MWDS for the pre-service teachers' needs in program management, the following areas may need improvement for the pre-service teachers to be more successful: embedding graduation standards into the agriculture curriculum, establishing a program advisory committee, completing reports for local and state administrators, evaluating the local agriculture program, and determining the content that should be taught in specific courses (Table 6). The two lowest MWDS scores in program management were locating and selecting student references and materials, and conducting needs assessments to determine the courses that should be taught.

Table 6
Program Management Needs of Pre-Service Agriculture Teachers

	MWDS[1]
Embedding graduation standards into the agriculture curriculum	6.09
Establishing a program advisory committee	5.80
Completing reports for local and state administrators	5.49
Evaluating the local agriculture program	4.85
Determining the content that should be taught in specific courses	4.28
Developing relations with fellow teachers and administrators	2.96
Conducting needs assessments to determine the courses that should be taught	2.70
Locating and selecting student references and materials	2.54

Note. [1] Mean Weighted Discrepancy Score.

Conclusions/Recommendations/Implications

When the cooperating teachers rated the importance of pre-service teachers being knowledgeable in the area of FFA, leadership development, and SAE, the highest ranking area was conducting local FFA chapter activities. In the Mundt and Conners (1999) study, all of the survey participants rated managing the activities of the local FFA chapter as either very important or important. The cooperating teachers in this study confirmed what other researchers determined in their assessments; that developing SAE opportunities for students is essential

(Joerger, 2002; Garton & Chung, 1997; Garton & Chung, 1996). Preparing agriculture/FFA career development events was found to be important in this study as well as some that were conducted by other researchers (Garton & Chung, 1996, Garton & Chung, 1997; Joerger). Cooperating teachers are generally successful in all phases of the agricultural education program (FFA, SAE, and Classroom). The high importance they placed on conducting the local FFA chapter and developing SAE's is still encouraging. These findings indicate that cooperating teachers, who are integral parts of the teacher preparation process, are espousing the benefits of a total program of agricultural education.

Cooperating teachers ranked the following aspects as necessary for effective program management: developing relations with fellow teachers and administrators, establishing a program advisory committee, and determining the content that should be taught in specific courses. The same three areas of program management were found to be important when researchers surveyed beginning and experienced teachers (Joerger, 2002; Mundt & Conners, 1999; Garton & Chung, 1997). Because they have successful programs as measured by the Georgia Vocational Agriculture Teacher Association (GVATA) standards, cooperating teachers are the logical group to determine the critical areas for pre-service teachers to know.

Next, the cooperating teachers evaluated the pre-service teachers' abilities in FFA, leadership development, and SAE. They indicated that pre-service teachers were strongest in conducting local FFA activities. Beginning teachers in the studies conducted by Garton and Chung (1997) and Joerger (2002) rated themselves as competent in conducting FFA activities as well. The second highest competency area was providing guidance to students concerning post secondary education in the food, fiber, and natural resource industries. Joerger also asked the beginning teachers in his study to rate themselves on this topic and they felt that they were competent. In this study, pre-service teachers demonstrated competency in supervising students' SAE programs.

Joerger and Garton and Chung determined that the teachers they surveyed were competent in this area, but it did not rank as highly in their studies as it did in this study. According to cooperating teachers, pre-service teachers in this study demonstrated the least knowledge in establishing and organizing agricultural co-ops and internships (this topic was not addressed in the surveys that listed competency levels). The second weakest area for pre-service teachers was developing a variety of curriculum-based school-to-work activities, which was determined as a weak area for beginning teachers in the Joerger study. Establishing and organizing agricultural co-ops and internships and school to work activities was ranked low importance in this study also. More research should be conducted to determine how many schools implement agricultural co-ops and school to work programs. If large numbers of schools still use these programs, university curriculum may need to be modified to address the learning gaps of the pre-service teachers.

When this study looked at the area of program management, pre-service teachers were most competent in developing relations with fellow teachers and administrators, which also ranked as the highest competency area in the Garton and Chung (1997) study and tied for the highest area in the Joerger (2002) study. In this study, locating and selecting student references and materials, and determining the content that should be taught in specific courses were the next

two highest competency areas. Garton and Chung agreed that beginning teachers were fairly competent in this area, but the two cohorts of the Joerger study disagreed, with the 2000 cohort saying they were not very competent in the two areas and the 2001 cohort saying they were competent. Cooperating teachers indicated that pre-service teachers showed the most weakness in embedding graduation standards into the agricultural curriculum (Joerger found that the 2001 cohort in his study was also weak in this area). The second weakest area for Georgia pre-service teachers was conducting needs assessments to determine the courses that should be taught, which was also a weaker area for the teachers in the Joerger study. With the change in high school agriculture curriculum, university curricula should be modified. Also, educators (ie. state staff, teacher educators, etc.) will need to offer in-service training for all teachers (beginning and advanced).

The mean weighted discrepancy score (MWDS) was used to determine the need for additional training for the pre-service teacher using the cooperating teachers' perceived importance and the pre-service teachers' competence of each area. In FFA, leadership development, and SAE, the areas in which the pre-service teachers need the most development according to the MWDS were developing an effective public relations program, preparing proficiency award applications, developing SAE opportunities for students, planning banquets, and preparing FFA degree applications. Competencies such as these could be better developed through practical hands-on experience. Teacher educators at the University of Georgia should challenge students (Collegiate FFA Members or students in a particular class) to develop activities that utilize and implement an array of agricultural communications/public relations techniques. Students in an agricultural education program should review proficiency award and FFA degree applications and be evaluated on their ability to complete these applications. Pre-service students also need to experience SAE development and banquet planning activities. The teacher education program at the University of Georgia needs to develop ways of making education related to program management (FFA, SAE, Laboratory) more effective.

When the research determined the MWDS for the pre-service teachers' needs in program management, the following areas may need improvement for the pre-service teachers to be more successful: embedding graduation standards into the agricultural curriculum, establishing a program advisory committee, completing reports for local and state administrators, evaluating the local agriculture program, and determining the content that should be taught in specific courses. Curriculum and program planning courses at the University of Georgia address each of these areas, but perhaps the way in which these competencies are taught should be more learner centered and inquiry-based, giving students more experiences to draw upon during the student teaching experience and as a beginning teacher.

Recommendations

Cooperating teachers work with pre-service teachers on a daily basis, give them advice, help them learn about the teaching process, and serve as a role model. Therefore, this study sought the knowledge and wisdom that the cooperating teachers held about the pre-service teachers' abilities in FFA, leadership development, SAE, and program management. The cooperating teachers did not always rate the pre-service teachers in ways that agreed with

previous research, perhaps because either the cooperating teachers rated the pre-service teachers on feelings rather than fact, or when teachers rated their own ability (as in many of the other studies), they tended to rank themselves higher in competency than someone else would rank them. A pre-service teacher preparation program may never be able to address all of the areas needed for pre-service teachers in agricultural education, but it should spend a considerable amount of time on issues that cooperating teachers feel are important.

Based on perceptions of cooperating teachers in this study, the following changes are recommended in Georgia. Since experience is so helpful, perhaps the weak areas determined by this study should be incorporated into the student teaching experience and addressed in university courses and through in-service training. Even though the teacher preparation curriculum is focusing on developing skills in the areas most identified by cooperating teachers, perhaps the function, format, and goals of courses should be re-evaluated. Teacher educators at the University of Georgia should challenge students (Collegiate FFA Members or students in a particular class) to develop activities that utilize and implement an array of agricultural communications/public relations techniques. Students in an agricultural education program should review proficiency award and FFA degree applications and be evaluated on their ability to complete these applications. Pre-service students also need to experience SAE development and banquet planning activities. The teacher education program at the University of Georgia needs to develop ways of making education related to program management (FFA, SAE, Laboratory) more effective. Curriculum and program planning courses taught at the university where this study was conducted should be more learner-centered and inquiry-based, giving students more experiences to draw upon during the student teaching experience and as a beginning teacher.

Further research should be conducted to determine how the cooperating teachers and the student teachers differ in their views of importance, competence, and subsequent learning gaps. Additionally, pre-service teachers and beginning teachers who have completed the teacher preparation program should be surveyed to identify specific causes for learning gaps.

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PERSPECTIVES OF SUCCESSFUL AGRICULTURAL SCIENCE AND TECHNOLOGY TEACHERS ON THEIR PREPARATION TO TEACH AGRICULTURAL MECHANICS

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Abstract

Mechanization is integral to American agricultural industry. Like the industry, technical knowledge and processes continue to evolve to better fit emerging physical conditions and economic circumstances. Instructional strategies have integrated project methods, problem-solving, and applications of mathematics and technical science as core elements of the secondary school curriculum. However, exigencies have led to dramatic reductions of course offerings by universities that are publicly responsible for the education and professional development of teachers.

This dilemma gave rise to the need to examine the perspectives of successful agricultural science and technology (AST) teachers and the education and experiences that are associated with their teaching success. Qualitative research methods were selected to investigate factors that enabled successful AST teachers to be more successful than were their peers. What factors motivate teachers to excel and what decision-rules influence how curriculum is selected, organized and delivered? Finally, this study focused on the recommendations of expert teachers regarding curricular improvements needed to prepare future teachers for this technical subject matter. Data were collected, analyzed, and reported using accepted qualitative protocols to develop emergent themes.

Successful AST teachers agreed that undergraduate course work did not adequately prepare them to teach the current curriculum. Unanimously, respondents expressed concern for the lack of scope, depth, and technical skills in agricultural mechanics or engineering technology being taught to future AST teachers. This concern about the pre-service curriculum led teachers to agree that three-week agricultural mechanics certification workshops are essential for successful instruction of agricultural mechanics. Furthermore, successful teachers recommended a formal mentoring program to assist in the professional development of AST teachers. Finally, the respondents recommended more quality workshops on the part of the state department of education, the professional teachers' organization, and the agricultural education community to improve the quality, scope, depth, and technical skills in secondary schools.

Introduction

McLean and Camp (2000) noted that "agricultural teacher educators have experienced significant pressure over the past 15 years to reform the process by which the teachers are prepared in the profession" (p. 25). Spurred on by a blue ribbon commission headed by Ross Perot, the passage of 1984 Texas Education Reform Bill (Texas House Bill 72), brought changes to curriculum and course content, as well as demanding more accountability. HB 72 established the Legislative Education Board to oversee the implementation of state-mandated education reforms and to reset public education policy.

Twelve teacher education programs in Texas offer course work designed to prepare teachers to instruct within the area of agricultural mechanics. These universities provide encouragement, advice, and expertise through in-service education and graduate courses after graduation; yet many teachers refuse to attempt instruction in the field of study, or omit units from course content to match their own knowledge and skill levels. Though this phenomenon occurs across all levels of experience, it is more prevalent among AST teachers with 10 years or less experience. This trend is compounded by a reduction of required instruction in agricultural mechanics during the undergraduate degree program. Hubert and Leising (2000) concluded that "research has shown that those teachers new to or preparing for the agricultural teaching profession often express anxiety for and a lack of preparedness to teach agricultural mechanics subject matter"(p. 18).

When observed in the schools, many AST teachers appear to lack competence in basic knowledge and skills included in the agricultural mechanics curriculum. Baker and Malle (1995) and McLean and Camp (2000) concluded that AST teachers are least competent in agricultural mechanics content when compared to other fields of study taught in high school agricultural sciences. These perceptions were confirmed by Hubert and Leising (2000) finding "numerous studies indicated that teacher knowledge of agricultural mechanics was in need of improvement both prior to and after accepting teaching positions" (p. 18).

Further evidence was found by the principal researcher while reviewing Texas FFA Career Development Event results. Younger or less experienced AST teachers do not successfully prepare students for the rigor of the event. Upon review of the 2003 Texas FFA Agricultural Mechanics CDE results, the principal researcher found competitive teams in the event (i.e., those in the top six placings) were coached by teachers who had an average tenure of 23.8 years.

Previously integrated into a four grade-level curriculum, agricultural mechanics units became nine stand-alone semester courses in an array of 42 approved semester courses. After several years of teaching or monitoring these courses, it was evident to teachers and college faculty alike that not all of the content of each course were included in "frequent" instruction. Current Texas AST teachers are expected to provide basic skills and knowledge in a broad range of topics. Units of instruction and course content vary from very basic to very specialized content areas.

Review of Literature

While Texas colleges and universities continue to amend degree plans to cope with changing legislation, demographics, and financial issues, Franklin (2001) found that universities are not adequately preparing teachers to instruct effectively in psychomotor skill instruction. He recommended "utilizing student teacher candidates to present demonstration skills in agricultural mechanic courses in college and university undergraduate courses can be a successful training experience that benefits both the student teachers and the college and university students" (p. 9-10). Baker and Malle (1995) concluded that the national average of eight semester hours of collegiate-level agricultural mechanics courses for an agricultural education certification did not

prepare young people to teach in this highly technical discipline. Croom (2003) concluded that "the teaching profession is one of the most visible professions in the world" (p. 1). When any major component of the curriculum is deleted or ignored, the discrepancy quickly becomes apparent.

Dyer and Andreason (1999) concluded that the lack of preparation to teach within the field of study, coupled with a great anxiety for safety instruction to prevent possible litigation, has driven young teachers away from the agricultural mechanics curriculum. Dyer and Andreason noted voids in teacher preparation in laboratory safety. Foster, Bell, and Erskine (1995) stated "the findings of this study agree with the earlier reported position of Klein (1991). He stated that 'total teacher responsibility demands too much based upon traditional teacher training and the inherent teaching culture'" (p. 7).

Buriak and Harper (2001) agreed that more training is necessary to adequately prepare pre-service teachers. "Teaching is a craft. To learn a craft, apprentices observe, work, and practice with a master craftsman, usually over some extended period of time" (p. 2). Harper, Buriak and Hitching (2001) found when recently certified Illinois agricultural science instructors were given the Agriculture Single Subjects Assessment Test (ASSAT) they performed best on the "Agriculture and Society" portion with an 80% competency level. These same instructors scored lowest on the "Agricultural Mechanics" portion with a 46.97% competency level. Harper, Buriak, and Hitchings concluded that significant changes in the university curriculum coupled with the reduced scope of college-level instruction have made it too expensive for teachers to instruct effectively in our present competency-based agricultural mechanics curriculum model. Ullrich, Hubert, and Murphy (2001) revealed "an element of weakness in curricula utilized by the teacher, and in the teacher preparation programs failing to prepare these individuals for the challenge of integrating safety and health concepts throughout the curriculum" (p. 9).

Beginning in 2005, all Texas AST teachers are mandated by Texas Education Agency and the State Board for Educator Certification to pass an exit exam produced by National Evaluation Systems. Twelve percent of the examination questions relate to agricultural mechanics content and deal with theoretical concepts as well as technical skill knowledge (National Evaluation Systems, 2004). The NES exam requires comprehension and application in agricultural machinery; internal combustion engines; land leveling and measurement, plumbing tools and skills; power tools and maintenance; tool identification and safety; and wood and metal fabrication. Current Texas university degree plans for AST teacher certification do not develop the theory and understand of these topics, let alone develop minimum technical skills.

Theoretical Framework

There are many factors related to teacher success. Some teachers are confident and competent in their instructional abilities to teach agricultural mechanics. Therefore as researchers, we assumed a very pragmatic approach to the research questions. Pragmatists view experience and reasoning as major sources of knowledge. Outcomes and results are useful to clarify the stated or desired reality (Driscoll, 2000). The reality is that some teachers with similar education and preparation are much more successful in the instruction of agricultural mechanics in a high school curriculum than are their peers. Consequently, a systematic inquiry should

recognize the interactions of economic, educational, physical, psychological, and social events that affect success. This research searched for reasons that explain teacher success from among current agricultural mechanics instructors. The inquiry sought consensus among successful teachers concerning how to better prepare future teachers to instruct in a technical subject.

Statement of Problem

One must ask if the present scope and sequence of todays university undergraduate courses and the current in-service and professional development activities effectively preparing AST teachers for success in teaching agricultural mechanics.

Research Questions

Research Question 1. What education and experiences enable certain teachers to develop successful agricultural mechanics programs? This question identified what formal education and related experiences teachers would explain their recognized success in teaching agricultural mechanics, be it formal education, previous course experience, industry experience, post-graduate workshops, advanced degrees or a combination of the mentioned experiences.

Research Question 2. What influences teachers to include certain portion of the agricultural mechanics curriculum? And what influences teachers to discard certain portions of the curriculum? Recognizing that some units of instruction are not attempted or taught within the curriculum, this question attempted to clarify why some teachers omit units from their instructional program.

Research Question 3. What steps should the agricultural education community take to increase quality instruction in agricultural mechanics in the future? This question probed ideas, perceptions, and recommendations of experts necessary to improve performance in teaching agricultural mechanics.

Assumptions

Four assumptions were identified during the planning and implementation of the research project. First, a qualitative study seeking to describe observations within case boundaries cannot be generalized to other populations. Second, a personal interview process is more likely to identify gestalt experiences and events that shape successful AST teachers careers. Third, a step-wise interview would achieve saturation of data required for sound qualitative research (Lincoln and Guba, 1985). Finally, interpretations of data through transcribed interviews and member checks would accurately capture the respondents' thoughts and experiences.

Delimitations

This study was delimited to recognized, successful instructors of high school agricultural mechanics throughout Texas, with no regard for geographic region, ethnicity, or gender. Therefore, this study was delimited to a pool of teachers with five or more years of teaching experience. Teaching experience included instruction in the general agricultural mechanics pre-

employment laboratory, instruction in several agriculturally related courses, and/or consistent success in the Texas FFA Agricultural Mechanics CDE or Texas FFA Tractor Technician CDE.

Limitations

Experiences and events confirming success of the AST teacher were carefully defined. Successful instruction in the agricultural mechanics portion of AST curriculum included: (1) success in FFA CDE team preparation; (2) increased student enrollment in courses; and/or (3) the implementation of new agricultural mechanics courses into the curriculum.

Methods and Procedures

This qualitatively-designed inquiry encapsulated the perceptions of successful AST teachers (respondents) who were widely recognized in Texas for their successful instructional programs in agricultural mechanics. Qualitative research techniques included archival research, personal interviews, and member checking to provide for triangulation (Lincoln and Guba, 1985). This inquiry was conducted during the late spring and summer. This prolonged engagement and persistent observation were employed to increase trustworthiness (Erlandson, 1993). Interviews were confidentially conducted by the principal researcher after informed consent using IRB protocols.

Target Population and Pool Size

Erlandson (1993) concluded, “Purposive sampling requires a procedure that is governed by emerging insights about what is relevant to the study. . .” (p. 148). The pool was drawn using four criteria: (a) have coached an agricultural mechanics CDE team that competed in state-level contests at least three of the last five years, (b) have coached a tractor technician CDE team to compete in state-level contests at least three of the last five years, (c) have taught an agricultural mechanics pre-employment laboratory that had increased enrollment the last five years, and (d) have taught a successful agricultural mechanics program to include implementing a new TEA approved agricultural mechanics related course in the last five years.

Instrumentation

The qualitative research instrument was constructed by the researcher and approved by the Texas A&M University Institutional Review Board. The instruments focused on the education and previous industry experiences of the respondents, their independent perceptions of the teacher preparation certification as it related to agricultural mechanics, and the respondents' ideas on how teacher preparation could be improved. The respondents were asked to provide demographic data to verify they met the qualifications for the pool.

Data Collection and Analysis

Six interviews were conducted at local high schools beginning in June and concluding in August, four interviews were conducted during the Texas FFA state degree check, and 10 were completed during the Texas FFA Convention. All interviews were scheduled at the convenience

of the respondent. The principal researcher conducted each interview privately with time allocated for a complete discussion. All conversations were audio taped to insure accuracy in the transcription of the findings as recommended for quality research (Berg, 1989). Transcriptions were provided to each respondent for verification of accuracy as a member check (Lincoln and Guba, 1985). To insure anonymity, respondents were sequentially coded using a notation (R1, . . . R 19) assigned at the onset of the transcription process and kept separately from names or other identifying information. Data were collected, recorded and analyzed by the principal researcher. Constant comparative analysis was used comparing each new interview with previous statements or themes to conceptualize the possible relationships. All quotations, inferences, or remarks used in the interviews were recorded confidentially. Finally, the principal researcher analyzed the responses to report all recurring themes.

Three basic research questions guided the interview: (1) What education or experiences enable certain teachers to develop successful agricultural mechanics programs? (2) What influences teachers to instruct in the portion of the agricultural mechanics curriculum they do teach? (3) What steps should the agricultural education community engage in to assure quality instruction in agricultural mechanics in the future?

Findings

Archival research through the Texas FFA CDE results and the Texas teachers' directory identified 26 successful AST teachers who met the research criteria and were recognized for high quality instruction and having substantial success with agricultural mechanics in their communities.

Nineteen experts were sequentially interviewed. Redundancy confirmed saturation of the data in the latter stage of interviews (Lincoln and Guba, 1985). Of the qualified respondents, the number of years teaching experience ranged from five to 32 years. Twelve were recognized early through archival research as successful in preparing agricultural mechanics CDE and/or tractor technician CDE teams among the top six in the state. Four AST respondents taught pre-employment laboratories. Three respondents had initiated new Texas Education Agency approved courses in agricultural mechanics during the last five years. Six of the respondents were Texas A&M University graduates, four from Texas A&I University (now Texas A&M University-Kingsville), four graduated from Tarleton State University, and two from Texas Tech University. The remaining three respondents completed undergraduate degrees at East Texas State University (now Texas A&M University-Commerce), New Mexico State University, and Southwest Texas State University (now Texas State University), each with one graduate.

There were two themes that emerged early in the inquiry: (1) Current Texas university agricultural education degree plans do not offer enough agricultural mechanics courses to effectively prepare respondents. Consequently each successful respondent had obtained technical and pedagogical training elsewhere; and (2) AST teachers often omit topics of instruction from the state adopted curriculum due to a lack of familiarity, comfort or because of safety and liability issues.

Findings: Research Question 1

What education or experiences enable certain teachers to develop successful agricultural mechanics programs? Successful respondents held similar views concerning the education received by AST teachers to instruct in agricultural mechanics. Most of the respondents admitted that they did not receive enough instruction during their undergraduate programs to provide adequately for their students or the subject. “Did your undergraduate course work adequately prepare you to teach the current agricultural mechanics curriculum?” Thirteen of 19 interviewees answered the question with “no” (R1, 3, 4, 5, 6, 8, 10, 11, 12, 14, 15, 16, 17). All of the recognized instructors attributed previous industry experience, postgraduate education, or a three-week certification workshop as major factors contributing to their successes. None of the respondents professed to have become adequately acquainted with the field of study during their undergraduate programs that were similar to the current nine-hour program offered at most universities.

Undergraduate Curriculum. Five respondents viewed their education in agricultural mechanics to be adequate for them to instruct in the current curriculum. However, of the five (R2, 7, 9, 13, 18), all had at least 15 hours of agricultural mechanics instruction during their undergraduate degree. Their successes were attributed to advanced courses beyond minimum requirements, previous industry experiences, or the influence of key mentors within the community of practice.

Of those who answered the question with a “no,” eight had attended a three-week pre-employment laboratory workshop with being the greatest influence on their successes (R1, 4, 5, 8, 12, 14, 15, 16). Six had previous industry experience and credited it as the largest factor contributing to their success, more so than any undergraduate coursework (R4, 7, 9, 11, 16, 17). R17 concluded, “My B.S. degree exposed me to about 30% of what I teach today.”

Three-Week Short Course. To explain their successes in teaching agricultural mechanics, eight respondents (R1, 4, 5, 8, 12, 14, 15, 16) pointed to the three-week agricultural mechanics pre-employment laboratory certification workshop as the greatest single influence on their ability to teach agricultural mechanics. R1 characterized the experience as “without a doubt, the best career experience for me to improve my teaching was the three-week certification workshop with Dr. Billy Harrell.”

Industry Experience. Four of the responders (R7, 9, 11, 16) cited previous industry experience before their undergraduate coursework as a major criterion for their success. R9 stated unequivocally that 15 hours of undergraduate course work prepared him to teach the curriculum. He then shared a caveat: “after returning back to college, I was a certified welder. I had worked offshore in the oil industry for four and a half years. I choose to attend Texas A&I University because of its location and the opportunity to continue work in that industry. I was very fortunate to have very good instructors . . . that actually took me to the next level.” Industry experience was frequently referenced as an important factor (R7, 9, 11, 16)

Mentoring. All respondents described a mentoring process that was essential to them to become successful in the profession—whether that relationship was with former teachers, current

university faculty, teaching peers, industry colleagues or family members. R3 observed "You've got to have somebody help you be creative with the material you're presenting and the way you're presenting it. . . . you don't get it at the universities" (R3, 4, 10, 13). R4 summed up the emerging theme; "I think the mentor relationship is imperative—it has to be there. . . . I've picked up the phone in the middle of the night and called Dr. Harrell and asked him how to solve a problem. . ." Nine of the 19 individuals (R1, 2, 4, 5, 6, 8, 9, 10, 12) recognized Dr. Billy Harrell at Sam Houston State University and relied on him for guidance and direction as much as technical support. Eight of the 19 individuals identified Dr. Lon Shell of Southwest Texas State University for his teaching and motivation of AST teachers (R3, 4, 5, 6, 10, 13, 14, 17). Six other Texas professors were recognized for their mentoring roles. Ten interviewees also included local business or industry personnel as mentors, motivators and enablers (R3, 6, 9, 11, 12, 13, 14, 16, 17, 18). Mentors make a difference.

Findings: Research Question 2

What influences teachers to instruct in the portion of the agricultural mechanics curriculum they do teach? Also perceived through the interviews was a theme that most instructors do not include all of the topics in the state adopted curriculum. When asked specifically, sixteen respondents stated very confidently that most of their peers do not teach all the recommended topics within the curriculum (R1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18). Only two individuals, when asked if they thought those peers adequately covered all topics in the curriculum, answered the question in a manner complimentary to their peers (R5, 9). Respondents recognized a variety of reasons for their peers not to teach the complete curriculum: allotted time, limited knowledge and confidence of the teacher, a lack of interest or effort and safety issues.

R10 noted that ". . . very few teachers in Texas cover agricultural mechanics the way it should be covered. And I feel very strongly on this, I feel that agricultural teachers cover what they know and what's easy and what's comfortable and are very scared of newer technology or something that they did not know or that they think the kids may not want to learn. Because it takes some classroom time or book time or lecture time to learn it, before you go out in the shop. Outside of welding, or electricity, or maybe some engines, teachers will balk at anything else." R17 agreed saying ". . . no. I think they are probably exposed to about 85% of the material and come away with about 60% of it."

Nine of the 19 respondents (R3, 4, 6, 7, 10, 13, 15, 17, 18) recognized a general lack of knowledge to allow the instructor to be comfortable teaching across the curriculum. R7 commented "students are pretty bright. I guess every school has them and I get a lot of students in the program that already have some background; they either grew up on a farm or their dad's a welder or whatever the case might be so they already have some skills. If you can't show them that you have those skills or can expose them to some new techniques or technology, I think your credibility is affected."

Three respondents (R1, 14, 16) concluded that a general lack of interest or effort by the instructor was the major shortcoming. R17 added ". . . no experience, and they don't feel capable." R18 agreed ". . . no background, they are scared and don't want people in town to

know how little they do know." R14 summed up an emerging theme with "so many (teachers) fall into those traps . . . too intent on teaching a contest and building projects . . . or just doing fabrication. Some of the kids that are good at one thing, they just let them do that for everybody. I don't know how they have time to teach it all."

Findings: Research Question 3

What steps should the agricultural education community engage in to assure quality instruction in the agricultural mechanics discipline in the future? During the interview process, the very qualified respondents contributed several meaningful ideas for the agricultural education community to consider for future preparation of agricultural science instructors. Among these recommendations was the consistent theme that the universities must bolster the agricultural mechanics or engineering required for certification, that the pre-lab certification workshops must remain intact, and that a mentoring system would improve teacher success in agricultural mechanics.

Several respondents recommended more core courses in agricultural mechanics or engineering for certification to bolster pre-service teachers' confidence and credibility. R1 questioned if the current university instruction in agricultural mechanics is going in the right direction. "I doubt if they offer an adequate amount or if the instruction in the courses is working toward helping those teachers cover the TEKS they are going to have to teach." R3 commented . . . "not discrediting my fellow teaching partners . . . (but they) didn't get any agricultural mechanics in college. . . . They need some competency level to go out there and teach and a lot of our kids (young teachers) don't have it now." R5 confirmed that . . . "I have had several student teachers and I think some of them really come out lacking in some of the agricultural mechanics areas. There's a lot of them that seem to be lacking in basic things." R6 noted that "every one of the TEKS curriculums calls for a certain amount of safety and yet they (teachers) haven't had it themselves, and yet they are to be responsible for a (safe) lab environment." R15 agreed ". . . more preparation at the collegiate level." The respondents with the most formal education in the field of agricultural mechanics or engineering felt that beginning instructors were ill-prepared to the point of encountering personal liability issues.

Successful AST respondents unanimously recommended systematic mentoring for young teachers to nurture their professional development. Respondents valued a three-week short course for agricultural mechanics to certify beginning teachers for the technical and skill-oriented curriculum. At the same time, respondents requested professional development workshops for themselves as well as less experienced teachers.

Summary, Conclusions, and Recommendations

Baker and Malle (1995) and Harper, Buriak, and Hitchings (2001) warned about the lack of preparedness and confidence on the part of AST teachers induction into teaching agricultural mechanics. Harper, Buriak, and Hitchings (2001) concluded ". . . during the last twenty years, programs have diminished scope and many have undergone significant change" (p. 1). They went on to warn that when we ". . . couple this change with the reduction in engineering technology or mechanization credits required for certification . . . it is obvious that competency-

based guidelines are too expensive and cannot be met by prospective teachers of agriculture" (p. 1).

Archival research found 28 AST teachers who were successful in their instruction of agricultural mechanics and met initial criteria as a successful group. Interview sampling was conducted until redundancy suggested saturation of the data (Lincoln and Guba, 1985). Findings were reported for each of the three basic research questions: (1) What education or experiences enable certain teachers to develop successful agricultural mechanics programs? (2) What influences teachers to instruct in the portion of the agricultural mechanics curriculum they do teach? and (3) What steps should the agricultural community engage in to assure quality instruction in agricultural mechanics in the future?

This inquiry validated other research literature (Baker and Malle, 1995; Buriak and Harper, 2001; Dyer and Andreason, 1999; Harper, Buriak, and Hitchings, 2001; Hubert and Leising, 2000; and McLean and Camp, 2000) that there is a lack of scope, depth, and technical instruction obtained in current Texas teacher education universities.

A successful teacher recommended a review of the strategic plan and the priorities for program development based on societal need. R6 recommended ". . . the agricultural education family as a whole needs to sit down and look at their curriculum and ask themselves what are we preparing our students for, what are we preparing them to do, what can we do to strengthen their competence level to go out and reach young people? They need to look at their budget, prioritize their academic areas of emphasis, and add more agricultural mechanics."

Respondents felt strongly that agricultural mechanics courses should remain an integral part of the high school curriculum. Harper, Buriak, and Hitchings (2001) in their summation of Rosencrans and Martin work, recommended that "agricultural mechanization continue to be viewed as a viable component of secondary agricultural education to reflect emerging technologies, problem-solving, critical thinking, systems approaches, as well as science and mathematics applications" (pp. 1-2).

Conclusions: Research Question 1

What education or experiences enable certain teachers to develop successful agricultural mechanics programs? Of the 19 respondents, thirteen professed not to be prepared to instruct in the agricultural mechanics curriculum at the onset of their teaching careers (R1, 3, 4, 5, 6, 8, 10, 11, 12, 14, 15, 16, 19). Of the remaining few who felt comfortable teaching, all had more class hours of agricultural mechanics than is currently required by universities for agricultural science certification. Currently Texas teacher education universities require from nine to 12 hours of agricultural mechanics or engineering for teacher certification.

Additionally, nine respondents recognized the TEA-approved workshops offered for certification in agricultural mechanics as the single biggest positive influence on their careers (R1, 4, 5, 8, 12, 14, 15, 16, 19). Three teachers cited previous industry experience as the greatest contributor to their teaching careers in agricultural mechanics (R7, 9, 11). Six others noted a

combination of things including several additional hours of collegiate instruction and previous experiences (R2, 3, 6, 13, 17, 18) as the major reasons for their successes.

Conclusions: Research Question 2

What influences teachers to instruct in the portion of the agricultural mechanics curriculum they do teach? Seventeen of 19 successful teachers recognized that not all portions of the approved agricultural mechanics curriculum for high school agricultural sciences are adequately taught in depth, scope, and quality (R1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19).

Eleven respondents felt that a lack of preparedness of the teacher was the major reason units of instruction were omitted from the approved curriculum (R1, 3, 4, 6, 7, 10, 13, 15, 17, 18, 19). “They’re probably just like me, they have areas they feel very comfortable and confident in, and they probably spend more time in those areas than in others they feel least qualified” (R3).

Most of the respondents cited one of the current leaders in collegiate agricultural mechanics instruction as a major influence on their recognized success. Nine AST teachers noted Dr. Billy Harrell of Sam Houston State University was a major influence (R1, 2, 4, 5, 6, 8, 9, 10, 12) and nine credited Dr. Lon Shell of Southwest Texas State University as an exemplary mentor (R3, 4, 5, 6, 10, 13, 14, 17, 19).

When asked to explain some lack of instruction in all areas of the curriculum, six respondents noted a shortage of time and interest on the part of the teacher. Three of the respondents alluded to the issue of time. Three members mentioned the lack of interest or effort on the part of the instructor as a reason for failing to include all areas of the curriculum.

Conclusions: Research Question 3

What steps should the agricultural education community engage in to assure quality instruction in the agricultural mechanics discipline in the future? Eighteen of 19 teachers insisted that more instruction in agricultural mechanics or agricultural engineering was necessary for the bachelor’s degree and agricultural science teacher certification. When asked if the teacher education universities offered enough courses in agricultural mechanics currently for future agricultural science teachers to successfully teach agricultural mechanics, 18 stated or implied that they did not (R1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19). Fourteen of the 19 respondents stated that more workshops in the field of teaching high school agricultural mechanics were imperative (R1, 3, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 19). Additionally, all respondents felt that a mentoring process was critical in their personal development and should be promoted. “The mentoring process has got to be there” (R1). Also 12 of the respondents predicted a shortage of qualified university professors to teach and mentor agricultural science teachers (R1, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 19).

Conclusions

After a careful review and analysis of the interview transcripts used in this work coupled with a 23 year immersion in the community of practice by the principal researcher, several themes emerged. The teacher education universities in Texas must re-examine the number of agricultural mechanics courses in the degree plan. Preservation of the three-week agricultural mechanics certification workshop is crucial. The agricultural community as a whole should develop systematic mentoring whereby recognized experienced teachers tutor early-career AST teachers. Texas universities with teacher education programs, Texas Education Agency, and the Vocational Agriculture Teachers Association of Texas (VATAT) must collaborate to provide systematic, hands-on, technical skill enhancing professional development workshops. The agricultural community as a whole must continue to encourage pre-service teachers to advance their education and enter the teacher education profession.

Recommendations

As a result of this analysis, the researchers offer the six recommendations in no particular order for public action:

Recommendation 1. Systematic mentoring of early-career teachers tied to a public action plan must be a commitment from the agricultural education community as a whole.

Recommendation 2. A commissioned comprehensive state-wide task force review the roles, scope and organizational delivery of knowledge and skills essential for students preparing for careers in contemporary agricultural industry. Task Force recommendations should address teacher preparation, certification, graduate education, industry internships and in-service education that advance student success and meet societal needs.

Recommendation 3. Commission research to identify alternative strategies necessary to develop critical competencies during pre-service teacher certification programs.

Recommendation 4. Commission research to identify contemporary “emphasis areas” of knowledge and skills, whereby degree plans are structured to encourage pre-service teachers to gain expertise in one or more knowledge domains. This research should couple degree plans with learning agreements, communicate learning outcomes, and empower multiple forms of credit in several educational settings.

Recommendation 5. A statewide plan should include strategies to reward teachers for continue professional development, life-long learning and teaching excellence. Incentives should be identified to reward student career success and teacher professional development.

Recommendation 6. Professional development become a shared responsibility on the part of Texas public universities that prepare AST teachers, the Texas Education Agency, the State Board for Educator Certification, Texas Independent School Districts and the agricultural industry.

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STRUCTURED COMMUNICATION: EFFECTS ON STUDENT TEACHER – COOPERATING TEACHER RELATIONSHIPS

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Abstract

Perceptions held by agricultural science student teachers about their relationship with cooperating teachers during field experiences is a variable that may affect the number of student teachers entering the profession. The purpose of this study, which was part of a larger study, was to examine the effects implementing structured communication between student teachers and cooperating teachers would have on student teachers' self-perceived relationship between the student teacher and cooperating teacher during the student teaching experience. The learning environment of these field experiences must be more fully understood to explain why some student teachers enter the profession of agriculture science teaching, and others do not. This study employed a quasi-experimental design with a non-random sample (N=81) in a multiple time-series design. The average respondent in this study was a 23 year old white undergraduate female placed at a multiple placement cooperating center. Through contrast analysis, the age and academic standing of student teachers significantly affected their perception of the value cooperating teachers placed upon student teacher – cooperating teacher relationships. Structured communication influences student teachers' perception of their relationship with the cooperating teacher. To better understand perceptions of student teachers regarding the student teacher – cooperating teacher relationship, additional research should be conducted.

Introduction

The National Council for Agricultural Education (The Council, 2002) created the initiative Reinventing Agricultural Education for The Year 2020. The first goal outlined in this report was to provide "an abundance of highly motivated, well-educated teachers in all disciplines, pre-kindergarten through adult, providing agriculture, food, fiber and natural resource education" (The Council, 2002, p. 4). Agricultural education is charged to provide the most highly motivated and efficacious teachers to improve knowledge about agriculture. How can preparatory agricultural education professional programs accomplish this task? Does preservice teacher education provide skills and abilities, beliefs, and motivation to teacher education graduates of agricultural education departments? Are there avenues of research to improve those abilities and skills, beliefs, and motivation of preservice teacher education?

The discipline of agricultural education continually faces a deficiency of qualified teachers filling positions in public schools (Camp, Broyles, & Skelton, 2002). Camp et al. (2002) reported there were 798 secondary agricultural education positions available for new graduates of agricultural education in 2001. Of the 857 newly qualified agricultural education graduates, only 509 (59%) chose to enter the profession of agricultural education at the secondary level.

The discipline of agricultural education graduates enough professionals to fill the positions available, and yet many of those graduates choose not to enter the field of agricultural education. What factors contribute to a graduate's choice to enter the profession of agricultural education?

A significant element of preservice teacher preparation is the field experience portion of most teacher education programs. Field experiences are usually conducted as early field experiences and student teaching. Both have been found to contribute to a decision to enter the profession of agriculture education. Myers and Dyer (2004) stated that being involved in early experiences contribute to preservice teachers' decision to enter the profession at the secondary level. They also stated that preservice teachers in agricultural education programs alter their beliefs as a result of field experiences. Therefore, it is concluded that field experiences can have dramatic effects upon the perceptions of those involved in these experiences.

Student teaching is an important element of the teacher education program (Borne & Moss, 1990; Deeds, Flowers, & Arrington, 1991; Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002; Norris, Larke, & Briers, 1990). Furthermore, both early field and the student teaching (field) experiences positively impact preservice teachers of agricultural education programs (Myers & Dyer, 2004). Teacher education programs must place student teachers at cooperating centers that provide the best experience available (Borne & Moss, 1990). Agricultural education must look into how the teacher education programs are structured and define avenues that will allow graduates to be motivated to enter the agricultural education profession. Camp et al. (2002) stated teacher education programs should expand their capabilities to prepare student teachers to meet the needs of secondary agricultural education programs.

Fritz and Miller (2003) concluded student teachers should "reflect on their daily concerns and receive feedback … communicate with other student teachers and supervisors" (p. 51). Structured communication between the cooperating teacher and student teacher is a vital link that needs to be addressed to understand beliefs held by student teachers. Dewey (1980) stated:

> Not only is social life identical with communication, but all communication … is educative. To be a recipient of a communication is to have an enlarged and change experience. One shares in what another has thought and felt … has his own attitude modified. Nor is the one who communicates left unaffected. (p. 8-9)

Theoretical Framework

The theoretical framework of the study is grounded in the theory of constructivism. Constructivism operates under the premise that learners create understanding through experience (Fosnot, 1996; Schuman, 1996). Doolittle and Camp (1999) proposed four epistemological tenets of constructivism based upon literature (Dewey, 1980; Garrison, 1997; Gergen, 1995; Larochelle, Bednarz, & Garrison, 1998; Maturana & Varella, 1992; Von Glaserfield, 1984); the four tenets are as follows:

> 1) knowledge is gained through dynamic cognizing by the individual, 2) individual behavior becomes more viable in particular environments because of the adaptive nature of cognition, 3) cognition is not a method to create accurate representations of reality but organizes and clarifies an individual's sense of experiences, and 4) learning is mutually

> rooted in cultural, social, and language-based interactions and neurological/biological construction. (p. 6)

Therefore, Doolittle and Camp (1999) concluded that constructivism recognizes the student's constant position in "the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality" (p. 7). These basic principles provide the foundation of the learning, knowing, and teaching process which can be differentially emphasized resulting in a menagerie of degrees of constructivism.

Social constructivism will act as the foundational principle for this study. The two basic tenets of social constructivism provide that knowledge is social in nature and knowledge is the result of social interaction rather than an individual experience. Therefore, we must conclude that through social interaction learners are able to gain knowledge through the dynamic interplay of social interactions that clarify knowledge based on experiences rooted in cultural, social, and language-based interactions and neurological/biological construction.

Student teaching is the capstone experience of many teacher preparation programs. This event impacts the experience held by student teachers through numerous experiences occurring during the field experience. One of the major factors during this experience for student teaching is the cooperating teacher. Many institutions have stringent guidelines for choosing cooperating teachers and placing student teachers at cooperating centers.

Kasperbauer and Roberts (2007a) found that the student teachers' perceptions of the student teacher and cooperating teacher relationship were not predictive of a decision to teach. This study further concluded that the student teacher and cooperating teacher relationship is important to student teachers involved in field experiences (Kasperbauer et al., 2007a). This finding implies student teachers value their perceptions of relationships with cooperating teacher. Another study conducted by Kasperbauer and Roberts (2007b) evaluated changes in student teacher perceptions of the cooperating teacher and student teacher relationship during student teaching field experiences. This study concluded that student teachers' perceptions of cooperating teachers' relationship level exhibited decreased throughout the student teaching experience (Kasperbauer, et al., 2007b). This study, although not to be generalized beyond the population studied implies that as student teachers engage in field experiences their perception of the level of relationship exhibited by cooperating teacher decreases.

David Berlo developed the Source-Message-Channel-Receiver (SMCR) model. The SMCR model consists of four main areas: source, message, channel, and receiver. However, the model also considers feedback in order to make the model more complete. In this model, source is where a communication originates (Guth & Marsh, 2006). The use of this model can readily be translated through the communication that occurs through the student teacher and cooperating teacher relationship. As the cooperating teacher is considered the supervisor of the student teacher during the field experience, the cooperating teacher will serve as the source of many communication roles such as subject matter expert, daily performance evaluator, and supervisor.

Purpose

Understanding the needs of student teachers during the student teaching phase of their professional training program is paramount to producing highly qualified and motivated professionals who will enter the profession. The purpose of this study, which was part of a larger study, was to examine the effects implementing structured communication between student teachers and cooperating teachers would have on student teachers' self-perceived relationship between the student teacher and cooperating teacher during the student teaching experience. A secondary purpose was to explore relationships between selected variables including gender, age, ethnicity, agriculture science experience, academic standing, agriculture work experience, and placement at cooperating center.

Based on consulted literature, the following hypotheses were developed to guide this study and tested *a priori* at the .05 level.

Ho_1: There is no difference in student teachers' perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool.

Ho_2: There is no difference in student teacher's perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool in the presence of gender, age, ethnicity, agriculture science experience, academic standing, agriculture work experience, or placement at cooperating center.

Procedures

This study employed a quasi-experimental design with a non-random sample in a multiple time-series design (#14) (Campbell & Stanley, 1963). Campbell and Stanley (1963) defined quasi-experimental designs as follows:

> There are many natural social settings in which research person can introduce something like experimental design into his scheduling of data collection procedures (e.g., the when and to whom of measurement), even though he lacks the full control over the scheduling of experimental stimuli (the when and to whom of exposure and the ability to randomize exposures) which makes a true experiment possible. (p. 34)

The design of this study was employed as follows:

Fall 2006 student teachers (*n*= 20)	O_1 X_1 O_2 X_1 O_3
Fall 2005 student teachers (*n*= 27)	O_1 O_2 O_3
Fall 2004 student teachers (*n*= 35)	O_1 O_2 O_3

The first measurement of the student teacher's perception of the relationship with the cooperating teacher (O_1) was taken at the end of the first four weeks of the semester in which the participant was involved in a field experience (student teaching). The second measurement (O_2) was taken during the fifth week of the 11-week field experience at the mid-semester conference between student teachers and teacher education faculty (university supervisors) of a university. The third (O_3) and final perception of the relationship between the student teacher and the

cooperating teacher measurement was taken at the end of the 11-week field experience. The intervention, or experimental variable (X_1), was introduced during the full field experience of the fall 2006 teacher education student teaching semester, incorporated weekly.

Threats to internal validity were addressed in the design of this study (multiple time-series design #14) (Campbell & Stanley, 1963). Tuckman (1999) stated "internal validity depends, in part, on the condition that the effect attributed to a treatment is a function of the treatment itself, rather than a function of some other unmeasured and uncontrolled differences between treated and untreated persons" (p. 9-10).

The sample for this study was student teachers enrolled in field experience at a university. This purposive sample was chosen to represent student teachers engaged in field experiences. This sample included three semesters of students during the student teaching phase of their teacher education program. The control groups consisted of student teachers enrolled in field experience at a university during the fall semesters of 2004 (n= 35) and 2005 (n= 27). The treatment group consisted of student teachers enrolled in field experience at a university during the fall semester of 2006 (n= 20). Therefore, the researcher makes the assumption that the results from this study can be inferred and inferential statistics are employed (Oliver & Hinkle, 1982). Judgments based on the findings from this study should be made with caution when generalizing to other groups of student teachers in agricultural education (Oliver & Hinkle, 1982).

The communication form employed in this study is an adaptation of a form used by the Department of Education at Florida State University. The communication form contains 12 sections of accomplished practices of the student teacher. Accomplished practices included: assessment, communication, continuous improvement, critical thinking, diversity, ethics, human development and learning, subject matter knowledge, learning environment, planning, role of the teacher, and technology. The cooperating teacher rated the student teacher based on their observation of prescribed practices each week. Comments and recommendations fields were available for each accomplished practice to further describe observations of the student teacher. Directions on using the communication tool and the submission process were outlined in both a short and long form provided to cooperating teachers. The communication form was used to aid in the communication process between the cooperating teacher and student teacher. The role of the communication tool was to document the implementation of the treatment in this study.

A researcher-developed instrument (Roberts, 2006; Kasperbauer & Roberts, 2007b) was utilized to collect perceptions of student teachers concerning the student teacher's relationship with the cooperating teacher. This instrument was developed to coincide with the background/demographic instrument. Cooperating teacher/student teacher relationship section consisted of 43 items rated on the student teacher's perception of this relationship. The four constructs used in this instrument were as follows: teaching/instruction, professionalism, personality, and cooperating teacher/student teacher relationship. The teaching/instruction construct consisted of nine statements. The professionalism construct contained 10 statements. The personality construct contained 10 statements. Finally, the cooperating teacher/student teacher relationship consisted of 14 statements. The scale used ascertains the level that the cooperating teacher exhibits those characteristics as perceived by the student teacher. Face and content validity were established through an expert panel in the Department of Agricultural

Leadership, Education, and Communications at Texas A&M University. Cronbach's Alpha reliability coefficient for the relationship questionnaire was .78.

A researcher-developed instrument (Roberts, et al., 2006; Kasperbauer & Roberts, 2007b) was utilized to collect background and demographic data for this study. This instrument was developed to coincide with the relationship instrument. Background/demographics section consisted of seven items: gender, age (years), ethnicity, placement at cooperating center, semesters of high school agricultural education courses completed, academic standing, and agriculture work experience. Dillman (2000) stated that questions having ready-made answers such as demographic questions gain more accurate responses. Face and content validity was established through an expert panel in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University.

Data were analyzed using SPSS® 15.0 for Windows™ statistical package. Demographics and background characteristics were assessed using descriptive statistics – means, frequencies, and standard deviations. In order to ascertain the influence of the independent variable, use of the communication tool, upon the dependent variable of perception of relationships, data collected on contextual variables (gender, age, ethnicity, agriculture science experience, academic standing, agriculture work experience, or placement at cooperating center) were used as covariates during data analysis. Repeated measures mixed design and repeated measures analysis of covariance were utilized to further delineate the findings of this study.

Data were analyzed for normalcy and an outlier was identified when descriptive statistics were employed. Further investigation of the data, revealed through box plot analyses identified the specific case contained in the treatment group (n=20). This case was identified and removed from further data analysis (N=81, treatment group (n=19). Judd and McClelland (1989) argue outlier removal is desirable, honest, and important.

Findings

The average respondent in this study was a 23 year old white undergraduate female placed at a multiple placement cooperating center. Data showed similar make-up of control and treatment groups in gender, age, and placement. The treatment group was composed of all white respondents but the control group reported two Hispanic and one Hawaiian or other Pacific Islander. Differences in demographics were also noted in agricultural sciences taken in secondary schools. It was reported a greater percentage of the control group respondents had never been enrolled in secondary agricultural science classes. In addition it was reported that a greater percentage had taken at least three or more semesters of secondary agricultural science classes.

Perceptions of student teachers on level of relationship exhibited by the cooperating teacher shown in Table 1 yielded data for control, treatment, and an overall measurement of groups of study. Data were collected at three points of the field experience. Mean scores for the perceptions of the student teacher on level of relationship exhibited by the cooperating teacher in the control group (n=62) for the three measurement points were 4.23 (SD = .63), 3.82 (SD = 1.04), and 3.89 (SD = 1.04), respectively. Mean scores for the treatment group (n=19) at the

three measurement points were 3.88 (SD = .79), 3.91 (SD = .83), and 3.77 (SD = .94). Data showed a decrease in mean scores by the control group from first measurement to the second measurement and then an increase from the second measurement to the third. The data for the treatment group showed a decrease from second measurement to the third measurement as the control group data also indicated an increase in mean score. The treatment group showed an increase from the first measurement to the second measurement in mean score whereby the control group's mean scores indicated a decrease in the perceptions of the level of relationship.

Table 1

Means Comparison of the Level of Relationship Exhibited by Cooperating Teacher

	1st measurement		2nd measurement		3rd measurement	
	M	*SD*	*M*	*SD*	*M*	*SD*
Control Group (*n*=62)	4.23	.63	3.82	1.04	3.89	1.04
Treatment Group (*n* = 19)	3.88	.79	3.91	.83	3.77	.94
Overall Group (*N*=81)	4.14	.68	3.84	.99	3.86	1.01

Note. Scale used to measure relationships had a range from 1 through 5. 1 indicating low importance perceived and 5 indicating the highest perception held by the respondent(s).

Null hypothesis one stated there is no difference in student teachers' perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool. Repeated measures analysis was used to test for differences in perceived level of importance of the relationship with cooperating teachers as seen by student teachers (see Table 2). This test produced a significance level of $p < .00$ (*Mauchly's W = .78*). In this case, the sphericity assumption was not met; therefore, Greenhouse-Geisser adjustment was used. The significance level of $p = .16$ ($F = 1.88$) suggests there were no differences in the student teachers perceptions of their cooperating teachers current level of relationship exhibited throughout the student teaching semester during the three data collection points (see Figure 1). The overall model was not significant (Between Groups, $p = .59$). The null hypothesis was held tenable and not rejected.

Table 2

Student Teacher Perceptions of Their Cooperating Teachers' Current Level of Relationship

Source	*df*	SS	MS	*F*	*p*	η^2	Power
Within Groups							
Relationship Level (RL)	1.63	1.80	1.10	2.34	.11	.03	.42
RL x Treatment Group	2	1.45	.72	1.88	.16	.03	.35
Error	119.31	55.98	.47				
Total	123						
Between Groups							
Treatment Group	1	.52	.52	.29	.59	.00	.08
Error	73	129.23	1.77				

Note. Sphericity assumption not met (*Mauchly's W* = .64, *p* = .03) [1]Greenhouse-Geisser adjustment used

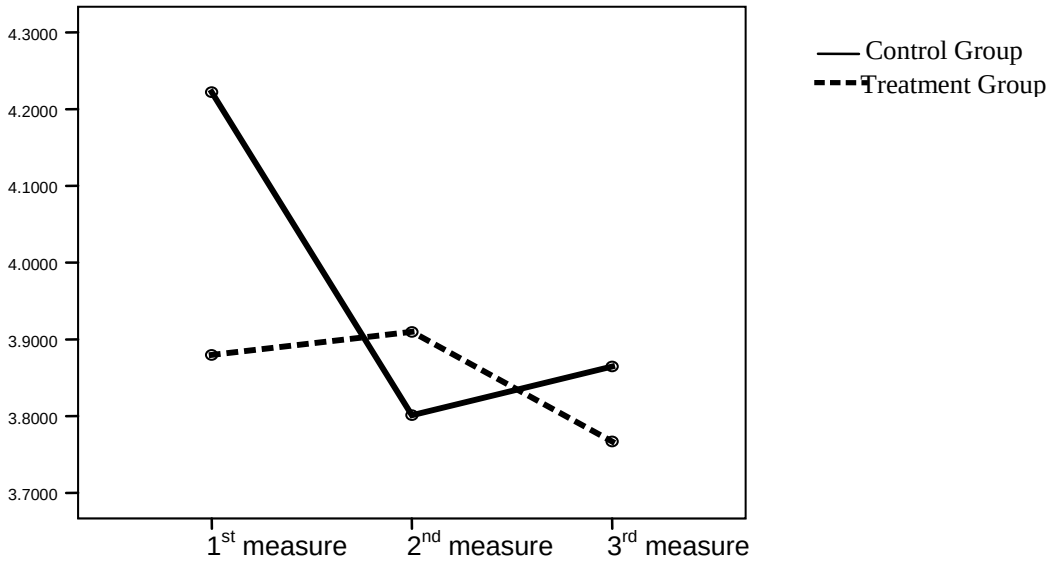

Figure 1. Mean plots of relationship level perception of student teacher for control and treatment groups.

Further data analysis revealed through within subject contrasts no significance on treatment group and perceptions of relationship of the cooperating teacher by the student teacher (see Table 3). It should be noted that overall both the treatment group and the control group displayed a reduction of their perception of the relationship through this time series design.

Table 3

Within Subject Contrasts for Relationship Level

Source		*df*	SS	MS	*F*	*p*	η²	Power
Within Group Contrasts								
Relationship Level (RL)	Level 1 vs. 2	1	2.17	2.17	2.46	.12	.03	.34
	Level 2 vs. 3	1	.09	.09	.22	.64	.00	.08
RL x Treatment Group	Level 1 vs. 2	1	2.88	2.88	3.28	.07	.04	.43
	Level 2 vs. 3	1	.60	.60	1.47	.23	.02	.22
Error	Level 1 vs. 2	73	64.12	.88				
	Level 2 vs. 3	73	30.09	.41				

Null hypothesis two stated there is no difference in student teacher's perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool in the presence of gender, age, ethnicity, agriculture science experience, academic standing, agriculture work experience, or placement at cooperating center. Repeated measures analysis was used to test for differences in perceived level of importance of the relationship with cooperating teachers as seen by student teachers (see Table 4). This test produced a significance level of $p = .01$ (*Mauchly's W = .67*). In this case, the sphericity assumption was not met; therefore, the Greenhouse-Geisser adjustment was used. The significance level of $p = .17$ ($F = 1.84$) suggests that there were no significant differences in the student teachers perceptions of their cooperating teachers current level of relationship exhibited throughout the student teaching semester during the three data collection points (see Figure 2). The overall model was not significant (Between Groups, $p = .49$). However, significance was found in the interaction between relationship level perceived by the student teachers and age ($p = .01$). This interaction shows high power (.82) with a small effect size ($\eta^2 = .09$). It should be noted that as age level of the sample increased, student teachers' perceptions of their cooperating teachers level of relationship exhibited was significantly increased. Overall, the model was not found significant and the null hypothesis was held tenable and failed to reject.

Table 4

Student Teacher Perceptions of Their Level of Relationship with Cooperating Teacher

Source	*df*	SS	MS	*F*	*p*	η²	Power
Within Groups							
Relationship Level (RL) [1]	1.50	1.01	.67	1.45	.24	.02	.26**
Interactions							
RL x Gender[1]	1.50	.61	.41	.88	.42	.01	.18**
RL x Age[1]	1.50	4.46	2.97	6.40	.01*	.09	.82**
RL x Placement[1]	1.50	1.79	1.19	2.56	.10	.04	.43**
RL x AgSc Semesters[1]	1.50	.37	.25	.53	.54	.01	.13**
RL x Academic Standing[1]	1.50	1.28	.85	1.83	.17	.03	.32**
RL x Ethnicity[1]	1.50	.40	.27	.58	.52	.01	.13**
RL x Ag Work Experience[1]	1.50	.52	.35	.74	.44	.01	.16**
RL x Treatment Group[1]	1.50	1.28	.86	1.84	.17	.03	.33**
Error	99.05	46.03	.47				
Total	113.00						
Between Groups							
Treatment	1	.89	.89	.48	.49	.01	.10**
Error	66	122.65	1.86				

Note. Sphericity assumption not met (*Mauchly's W* = .667, *p* = .0001) [1]Greenhouse-Geisser Adjustment Used), **p* significant < .05, ** power computed using alpha = .05.

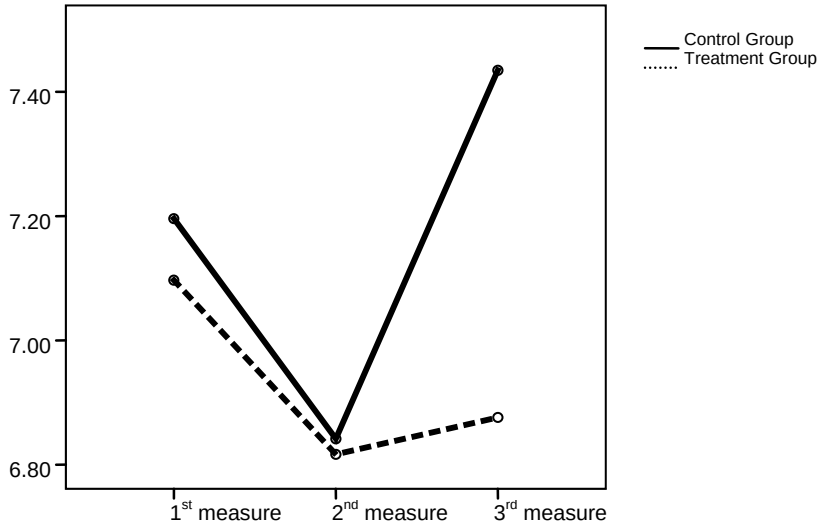

Figure 2. Mean plots of relationship level perception of student teacher for control and treatment groups with covariate adjustment.

Within subject contrasts did reveal three significant interactions. From the second to the third relationship measurement, age interacted significantly (F = 21.01, p = .00). Also from the second to the third measurement of relationship, academic standing interacted significantly (F = 8.20, p = .01).

Table 4-28

Within Subject Contrasts for Relationship Level with Covariates

Source		*df*	SS	MS	*F*	*p*	η²	Power
Within Group Contrasts								
Relationship Level(RL)	Level 1 vs. 2	1	.89	.89	.99	.32	.02	.17
	Level 2 vs. 3	1	.20	.20	.68	.41	.01	.13
RL x Gender	Level 1 vs. 2	1	.19	.19	.21	.67	.00	.07
	Level 2 vs. 3	1	.44	.44	1.48	.22	.02	.22
RL x Age	Level 1 vs. 2	1	.03	.03	.04	.85	.00	.05
	Level 2 vs. 3	1	6.20	6.20	21.01	.00*	.24	1.00
RL x Placement	Level 1 vs. 2	1	2.21	2.21	2.47	.12	.04	.34
	Level 2 vs. 3	1	.07	.07	.24	.63	.00	.08
RL x AgSc Semesters	Level 1 vs. 2	1	.22	.22	.25	.62	.00	.08
	Level 2 vs. 3	1	.15	.15	.52	.48	.01	.11
RL x Academic	Level 1 vs. 2	1	1.20	1.20	1.34	.25	.02	.21
	Level 2 vs. 3	1	2.42	2.42	8.20	.01*	.11	.81
RL x Ethnicity	Level 1 vs. 2	1	.75	.75	.83	.36	.01	.15
	Level 2 vs. 3	1	.42	.42	1.41	.24	.02	.22
RL x Ag Work Exp.	Level 1 vs. 2	1	.01	.01	.01	.94	.00	.05
	Level 2 vs. 3	1	.84	.84	2.85	.10	.04	.38
RL x Treatment	Level 1 vs. 2	1	2.46	2.46	2.74	.10	.04	.37
	Level 2 vs. 3	1	1.15	1.15	3.88	.05	.06	.49
Error	Level 1 vs. 2	66	59.09	.90				
	Level 2 vs. 3	66	19.48	.30				

Note. *p significant < .05

Conclusions, Discussion, and Implications

No significant difference was found in relation to student teacher's perception of their relationship with their cooperating teacher when a communication tool is used by cooperating teachers. Although not significant, a difference was shown in data reported by both groups. The

direction of the mean plots revealed through the implementation of structured communication change was observed in the second measurement. This measurement illustrated the treatment group increasing in their perception of the relationship and the control exhibiting a substantive decrease in mean scores. Because of data exhibited in this study, although not significant the downward trend of both groups in relation to relationship between student teacher and cooperating teacher should be further investigated.

Kasperbauer and Roberts (2007b) concluded that student teachers' perceptions of cooperating teachers' relationship level exhibited decreased throughout the student teaching experience. This study concurs with Kasperbauer et al. (2007b) with results exhibiting a downward trend in perceptions of relationships by student teachers of cooperating teachers. Communication is important in relationships and if the perception of the relationship erodes over time, the impact of sharing knowledge and experience may lessen.

No significant difference was found in relation to student teacher's perception of their relationship with their cooperating teacher when a communication tool is used by cooperating teachers in the presence of contextual variables. The perception of relationship held by student teachers may be an impacting variable as student teachers reflect upon experience and skill acquisition during this stage of their professional career. Although not significant, a difference was shown in data reported by both groups. The direction of the mean plots revealed through the implementation of structured communication with adjustment for covariate showed a change in the overall direction of the means plot. This measurement showed the treatment group decreasing in their perception of the relationship and the control showing a substantive increase in mean scores. Significance was found in relationship level perceived by the student teachers and age during data analysis. This interaction of age and relationship level shows that as age of student teacher increases, the perception of the level of relationship of the cooperating teacher increases. This is a significant finding because although the mean age for this study was 23 (range of 21 to 47), older student teachers may perceive relationships between themselves and cooperating teachers more importantly than do younger student teachers.

Although there is negligible research available regarding the importance of relationships in student teaching experience, their impacts can be paramount upon the perception of the whole experience of student teaching. Edwards and Briers (2001) conducted a focus group with and a quantitative follow up study of cooperating teachers who attended a workshop. This research identified items and the student teacher and cooperating teacher relationship were among five of the ten highest rated items through quantitative analysis. Further research should be undertaken regarding relationships during field experiences in agriculture education.

Recommendations for further research include replication of this study at other institutions involved in teacher education in agricultural education. Further knowledge about the impact of communication on the perception of the relationship between the student teacher and cooperating teacher will explain the effects structured communication can have on relationships during field experiences. A further recommendation is to educate cooperating teachers about the impact that communication has towards student teachers during field experiences and its effect upon the perceptions of student teachers. Cooperating teachers should be educated about the value and correct communication occurring during student teaching and its impact.

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EXPLORING THE EFFECTS OF STRUCTURED COMMUNICATION ON TEACHING EFFICACY OF STUDENT TEACHERS AND STUDENT TEACHER – COOPERATING TEACHER RELATIONSHIPS

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Abstract

Teaching efficacy beliefs of agricultural science student teachers, and their relationship with their cooperating teachers during field experiences, are variables that may affect the number of student teachers entering the profession. The purpose of this study, which was part of a larger study, was to examine the effects implementing structured communication between student teachers and cooperating teachers would have on student teachers self-perceived teaching efficacy, and the relationship between the student teacher and cooperating teacher during the student teaching experience. This study employed a quasi-experimental design with a non-random sample in a multiple time-series design. The average respondent in this study was a 23 year old white undergraduate female placed at a multiple placement cooperating center. Respondents in an environment where the amount and type of communication between student teachers and cooperating teachers was structured were less efficacious when compared to those respondents who were not in a structured communication setting. In addition, student teachers in a structured communication environment declined in their teaching efficacy measurements overall, whereas student teachers who were not involved in structured communication increased in their self-perceived teaching efficacy levels. Structured communication influences student teachers' beliefs regarding their ability to teach and their perception of their relationship with the cooperating teacher. In order to better understand the perceptions of student teachers regarding their teaching efficacy levels, and the student teacher – cooperating teacher relationships, additional research should be conducted in these identified areas.

Introduction

The initiative Reinventing Agricultural Education for The Year 2020 (The Council, 2002) provided a goal which stated "an abundance of highly motivated, well-educated teachers in all disciplines, pre-kindergarten through adult, providing agriculture, food, fiber and natural resource education" (The Council, 2002, p. 4). How can agricultural education teacher education programs accomplish this task? Are there avenues that can be researched in order to improve those abilities and skills, beliefs, and motivation of preservice teacher education?

In answer to these questions field experiences of student teachers should be explored. Field experiences are usually conducted as early field experiences and student teaching. Myers and Dyer (2004) stated that being involved in early experiences contribute to preservice teachers' decision to enter the profession of agricultural education at the secondary level. Furthermore, they stated that preservice teachers in agricultural education programs alter their beliefs as a

result of field experiences. Therefore, we must conclude that student teacher field experiences have dramatic effects upon attitudes of individuals involved in field experiences.

Student teaching is an important element of the teacher education program (Borne & Moss, 1990; Deeds, Flowers, & Arrington, 1991; Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002; Norris, Larke, & Briers, 1990). In addition, both early field and the student teaching (field) experiences positively impact preservice teachers of agricultural education programs (Myers & Dyer, 2004). Furthermore, student teaching is a period of active learning through experience. Student teaching experiences are physical experiences whereby the student teacher is immersed in experiences as a learner and also as a teacher practitioner. This experiential learning process will be enhanced through educational experiences that allow the student teacher to reflect on practices through communication with cooperating teachers. Because student teaching has been documented as an important element of the career preparation for agricultural education students (Borne & Moss, 1990; Deeds, Flowers, & Arrington, 1991; Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002; Norris, Larke, & Briers, 1990), the factors associated with teacher education programs and especially the student teaching experiences should be explored.

Theoretical/Conceptual Framework

The theoretical framework guiding this study, which was part of a larger study, is grounded in the grand theory of constructivism. Constructivism is based on the principle that we construct our perspectives of the world through individual experiences (Fosnot, 1996; Schuman, 1996). “What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind” (Johansson, 1991, p. 8).

Constructivism upholds a more unrestricted learning experience based upon individuals’ experience. This learning experience is not as easily evaluated nor is the results the same for every learner because constructivism perceives every learner as different based upon his/her experiences. Social constructivism will aid to the foundational base theory of this study. The two basic tenets of social constructivism provide that knowledge is social in nature and knowledge is the result of social interaction rather than an individual experience. Therefore, through social interaction learners gain knowledge through the dynamic interplay of social interactions that clarify knowledge based on experiences rooted in cultural, social, and language-based interactions and neurological/biological construction.

Self-efficacy theory emerged from Albert Bandura’s social cognitive theory. Bandura (1997) stated “perceived self-efficacy occupies a pivotal role in social cognitive theory because it acts upon the other class of determinants” (p. 35). Because self-efficacy is grounded in social cognitive theory, one of the primary tenets is reciprocal determinism. Bandura’s triadic reciprocality (1986, 1997) as portrayed through the social cognitive theory refers to the idea that personal factors (cognitive, affective, and biological), behavior, and external environment work collectively as determinants which impact each other bi-directionally in relation to self-efficacy. Therefore, self-efficacy can be analyzed as both a personal and a social construct given that individuals function individually and collectively (Knobloch, 2002). It should be noted that efficacy beliefs are defined and measured independently from performance.

Bandura (1977) classified teaching efficacy as a type of self-efficacy through his social learning theory. Teaching efficacy was initially defined as "the extent to which the teacher believes he or she has the capacity to affect student performance" (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p. 137). It has also been further defined as "the teacher's belief in his or her capability to organize and execute action required to successfully accomplishing a specific teaching task in particular context" (Tschannen-Moran, Woolfolk Hoy & Hoy, 1998, p. 22).

An important variable involved in field experiences is the relationship between the student teacher and cooperating teacher. Kasperbauer and Roberts (2007a) found that student teachers' perceptions of student teacher and cooperating teacher relationship were not predictive of a decision to teach. It was further concluded that the student teacher and cooperating teacher relationship is important to student teachers involved in field experiences (Kasperbauer et al., 2007a). This finding implies student teachers value their perceptions of relationships with cooperating teacher. Another study conducted by Kasperbauer and Roberts (2007b) evaluated changes in student teacher perceptions of the cooperating teacher and student teacher relationship during field experiences. This study concluded that student teachers' perceptions of cooperating teachers' relationship level exhibited decreased throughout the student teaching experience (Kasperbauer, et al., 2007b). This study, although not to be generalized beyond the population studied implies as student teachers engage in field experiences their perception of the level of relationship exhibited by cooperating teacher decreases.

In 1960, David Berlo, developed the Source-Message-Channel-Receiver (SMCR) model. Berlo's model is prevalent in agricultural communication research partly due to its elegance and partly due to its simplicity. The SMCR model consists of four main areas: source, message, channel, and receiver. However, the model also considers feedback in order to make the model more complete. In this model, source is where a communication originates (Guth & Marsh, 2006). Message is the content of the communication. Channel is the medium used to transmit the message to the intended receiver. Receiver is the person(s) for whom the message is intended. Feedback is the receiver's reaction (as interpreted by the source) to the message. Noise is also referred to as static and encompasses anything (physical or intangible) that may inhibit any part of the SMCR process from occurring. The use of this model can readily be translated through the communication that occurs through the student teacher and cooperating teacher relationship. As the cooperating teacher is considered the supervisor of the student teacher during the field experience, the cooperating teacher will serve as the source of many communication roles such as subject matter expert, daily performance evaluator, and supervisor of the student teacher.

Through a methodical review of the literature, a conceptual model was developed (Edgar, 2007) which postulates variables associated with teaching efficacy of student teachers during student teaching field experiences can be evaluated. This model incorporates Tschannen-Moran's et al. (1998) model of efficacy combined with Berlo's SMCR model of communication to effectuate a model that encompasses the effects of communication and the social context of efficacy postulated by Bandura (1997). A major component of the model is the teaching context as outlined by Dunkin and Biddle (1974) that involved the variables of presage and context. These variables are influenced by the efficacy level held by the individual and the experiences held by the teacher and student. Teaching efficacy is an individually held belief, and is an

outcome of the interaction (process variable) between presage and context variables. This outcome will then be affected through communication between the cooperating teacher and the student teacher. Conceptually, (see Figure 1) a model was postulated that proposes that the interaction between cooperating teachers and student teachers results in efficacy beliefs which are impacted through structured communication and social forces. Individual held beliefs are analyzed through the reflection process which adds to the construction of beliefs of performance.

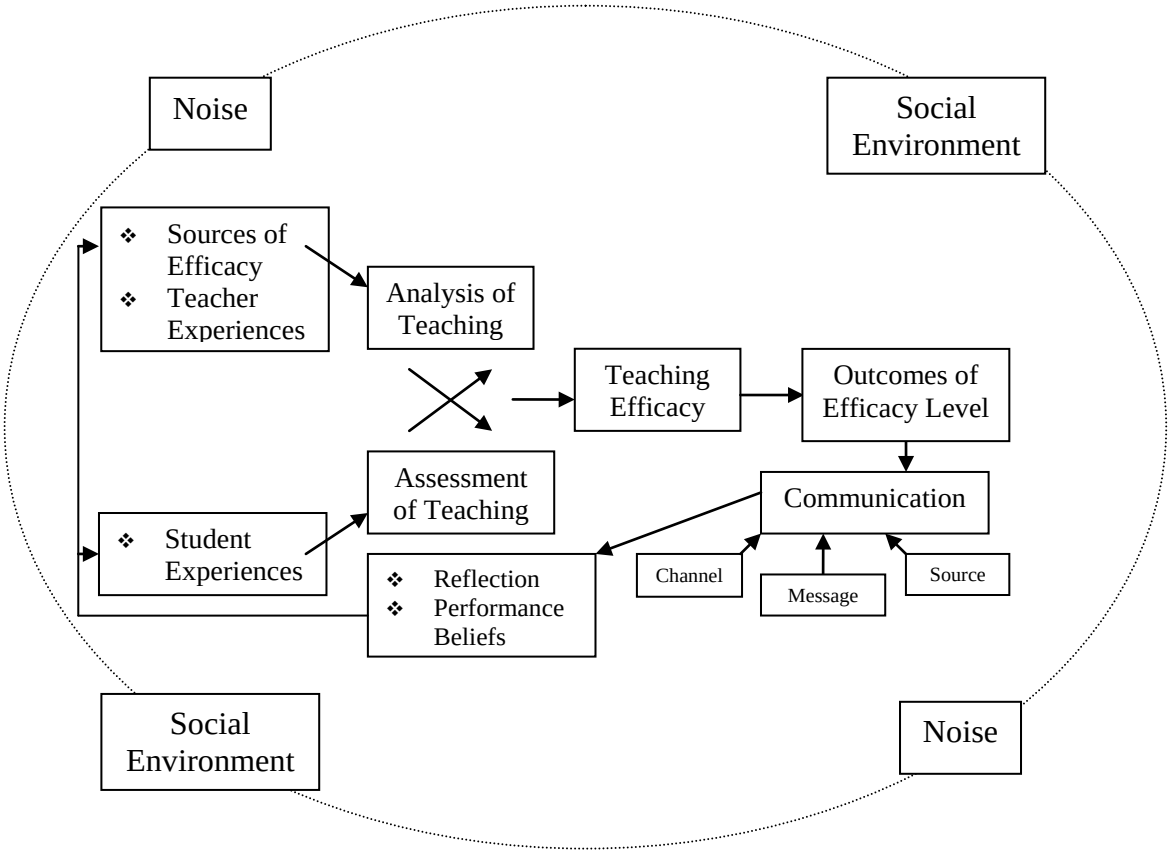

Figure 1. Conceptual model of teaching efficacy affected through structured communication.

Purpose

The purpose of this study was to examine the effects of implementing structured communication on teaching efficacy and on the relationship between the student teacher and cooperating teacher during the student teaching experience. Based on consulted literature, the following hypotheses were developed to guide this study and tested *a priori* at the .05 level.

Null Hypotheses

Ho_1: There is no difference in teaching efficacy and student teacher's perception of their relationship with cooperating teacher of student teachers when cooperating teachers use a communication tool.

Ho_2: There is no difference in teaching efficacy of student teachers when cooperating teachers use a communication tool.

Ho_3: There is no difference in student teachers' perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool.

Procedures

To address the purpose of this study and to test null hypotheses, a quasi-experimental design with a non-random sample in a multiple time-series design was employed (#14) (Campbell & Stanley, 1963). The design of this study was employed as follows:

Fall 2006 student teachers (*n*= 20)	O_1 X_1 O_2 X_1 O_3
Fall 2005 student teachers (*n*= 27)	O_1 O_2 O_3
Fall 2004 student teachers (*n*= 35)	O_1 O_2 O_3

Threats to internal validity were addressed in the design of this study (multiple time-series design #14) (Campbell & Stanley, 1963). Tuckman (1999) stated "internal validity depends, in part, on the condition that the effect attributed to a treatment is a function of the treatment itself, rather than a function of some other unmeasured and uncontrolled differences between treated and untreated persons" (p. 9-10).

The first measurement of teaching efficacy (O_1) was taken at the end of the first four weeks of the semester in which the participant was involved in a field experience (student teaching). The second measurement of teaching efficacy (O_2) was taken during the fifth week of the 11-week field experience during the mid-semester conference between student teachers and teacher education faculty of a university. The third (O_3) and final teaching efficacy measurement was taken at the end of the 11-week field experience. The intervention, or experimental variable (X_1), was introduced during the full field experience of the fall 2006 teacher education student teaching semester, incorporated weekly.

A purposive sample was chosen to represent student teachers engaged in field experiences at a university. The purposive sample included three semesters of enrolled preservice students during student teaching. Control groups consisted of student teachers enrolled in student teaching for fall semesters of 2004 (*n*= 35) and 2005 (*n*= 27). Treatment group consisted of student teachers enrolled in student teaching during the fall semester of 2006 (*n*= 20). Therefore, the researcher makes the assumption that the results from this study can be inferred and inferential statistics are employed (Oliver & Hinkle, 1982). Judgments based on the findings from this study should be made with caution when generalizing to other groups of student teachers in agricultural education (Oliver & Hinkle, 1982).

The communication form employed is an adaptation of a form used by the Department of Education at Florida State University. The communication form contains 12 sections of accomplished practices of the student teacher. Accomplished practices included: assessment, communication, continuous improvement, critical thinking, diversity, ethics, human development and learning, subject matter knowledge, learning environment, planning, role of the teacher, and technology. The cooperating teacher rated the student teacher based on their

observation of prescribed practices each week. Comments and recommendations fields were available for each accomplished practice to further describe observations of the student teacher. Directions on using the communication tool and the submission process were outlined in both a short and long form provided to cooperating teachers in the study.

Communication form data were collected during the fall 2006 semester only. Data were used to validate the implementation of the treatment in the study (fall 2006, *n*=20). Data were collected each of the 11 weeks of the field experience through a communication form available to cooperating teachers via the Internet or through print. After adaptation of the communication form, the researcher contacted each cooperating center, via land line to ascertain the best method to receive and send data on structured communication between themselves and their assigned student teacher. The tailored design method (Dillman, 2000) was employed to collect data pertaining to implementation of the communication form. Follow-up reminders were sent to non-respondents each Tuesday after the week the communication form was due. Follow up contacts were made via phone the following Friday.

Tschannen-Moran and Woolfolk Hoy (2001) developed the Teacher's Sense of Efficacy Scale (often referred to as the Ohio State Teacher Efficacy Scale (OSTES)). The OSTES consists of 24 items comprising three constructs, each of which contains eight items. The three constructs are quantified through scales named engagement, instruction, and classroom management. The reliability coefficient (Cronbach's Alpha) for each is as follows: Engagement = .87, Instruction = .91, and Classroom Management = .90. Subscale and total scores using the OSTES can be used to assess teacher efficacy (Tschannen-Moran, 2000). Content validity of the OSTES was established through an expert panel and consulting existing literature (Tschannen-Moran & Woolfolk Hoy, 2001). Construct validity was established through factor analysis and comparison to existing instrumentation. Face validity was established through a series of pilot tests.

A researcher-developed instrument (Roberts, Harlin, & Ricketts, 2006; Kasperbauer & Roberts, 2007) was utilized to collect background and demographic data. This instrument was developed to coincide with the teaching efficacy instrument used in this study. Background/demographics section consisted of seven items: gender, age (years), ethnicity, placement at cooperating center, semesters of high school agricultural education courses completed, academic standing, and agriculture work experience. Face and content validity was established through an expert panel in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University. Dillman (2000) stated that questions having ready-made answers such as demographic questions gain more accurate responses.

Data were analyzed using SPSS® 15.0 for Windows™ statistical package. Demographics and background characteristics were assessed using descriptive statistics – means, frequencies, and standard deviations. MANOVA and repeated measures mixed design were utilized to further delineate the findings of this study. Data were analyzed for normalcy and an outlier was identified when descriptive statistics were employed. Further investigation of the data, revealed through box plot analyses identified the specific case contained in the treatment group (*n*=20). This case was identified and removed from further data analysis (*N*=81, treatment group (*n*=19). Judd and McClelland (1989) argue outlier removal is desirable, honest, and important.

Findings

The average respondent in this study was a 23 year old white undergraduate female placed at a multiple placement cooperating center. Data showed similar make-up of control and treatment groups in gender, age, and placement. The treatment group was composed of all white respondents but the control group reported two Hispanic and one Hawaiian or other Pacific Islander. Differences in demographics were noted in agricultural sciences taken in secondary schools. It was reported a greater percentage of the control group respondents had never been enrolled in secondary agricultural science classes. In addition data analyzed showed a greater percentage of respondents in the control group had taken at least three or more semesters of secondary agricultural science classes.

Total measured constructs gathered through the OSTES instrument are shown in Table 1 for the control, treatment, and combined groups. Mean scores for total measurement in the control group (n=62) for the three measurement points were 7.20 (SD = .86), 6.84 (SD = .92), and 7.38 (SD = .87). Mean scores for the treatment group (n = 19) at the three measurement points were 7.05 (SD = .75), 6.74 (SD = .83), and 6.84 (SD = .72). Overall mean scores for the combined groups (N=81) were 7.17 (SD = .84, 6.82 (SD = .89), and 7.25 (SD = .87). Mean score analysis shows a general trend of decline from first to second measurement and a subsequent increase in mean score from second to third measurements of overall teaching efficacy. Treatment group mean scores declined from first to third measurement whereas the control groups showed an increase.

Table 1

Comparison of the Means of Teaching Efficacy of All Measured Constructs

	1st measurement		2nd measurement		3rd measurement	
	M	*SD*	*M*	*SD*	*M*	*SD*
Control Group (n=62)	7.20	.86	6.84	.92	7.38	.87
Treatment Group (n = 19)	7.05	.75	6.74	.83	6.84	.72
Overall Group (N=81)	7.17	.84	6.82	.89	7.25	.87

Note. Scale used to measure teaching efficacy had a range from 1 through 9. 1 indicating low efficacy levels held and 9 indicating the highest efficacy held by the respondent(s).

Null hypothesis one stated there is no difference in teaching efficacy and student teacher's perception of their relationship with cooperating teacher of student teachers when cooperating teachers use a communication tool. This hypothesis was tested using the MANOVA procedure. Teaching efficacy and student's perception of the relationship with the cooperating teacher were the dependent variables of study. Independent variables were the use of a communication tool by the cooperating teachers. The Box's M test was not significant (p = .73). Levene's test was not significant (p = .64 and p = .23). Table 2 shows the effects of the independent variable (structured communication) upon the dependent variables (teaching

efficacy (TE) and relationship level (RL) measured at the beginning and the end of the data collection period was shown with Pillai's Trace significance value of .06 with an $F = 2.881$. Effect size (η^2) was calculated at .07 and power at .55. The overall model was not significant. The null hypothesis was held tenable and not rejected.

Table 2

MANOVA Analysis of Variables of Study

Source		*df*	SS	MS	*F*	*p*	η^2	Power
TE	TE	1	5.39	5.39	9.89	.00	.12	.87
	RL	1	.03	.03	.03	.86	.01	.05
RL	TE	1	1.55	1.55	2.84	.10	.04	.38
	RL	1	9.93	9.93	10.60	.00	.13	.90
Treatment	TE	1	2.86	2.86	5.25	.03	.07	.62
	RL	1	.05	.05	.06	.81	.01	.06
Error	TE	73	39.79	.55				
	RL	73	68.43	.94				
Total	TE	77	4134.44					
	RL	77	1230.33					

Null hypothesis two stated there is no difference in teaching efficacy of student teachers when cooperating teachers use a communication tool. To determine if a difference existed in teaching efficacy between groups, repeated measures mixed design analysis was used. Sphericity assumption was met (*Mauchly's W* = .98, $p = .55$). Analysis results for teaching efficacy (see Table 3) provided a significance level of $p = .048$ ($F = 3.11$). The significance level of $p < .05$ suggests there was a significant difference in teaching efficacy throughout the three data collection points. However, the overall model was not significant (Between Groups, $F = 2.63$ and $p = .11$). The null hypothesis was held tenable and not rejected.

Further data analysis revealed through within subject contrasts (see Table 4) significance on treatment group and teaching efficacy from the second to the third measurement. Significance was also found in teaching efficacy of all groups from the first to the second measurement and from the second to the third measurement. The contrast did reveal a significant interaction ($F = 5.49$, $p = .02$) between teaching efficacy and treatment group from level two to level three. Thus, the treatment and control groups differed in the way their teaching efficacy changed during the second half of their experience.

Table 3

Teaching Efficacy Mean Comparison

Source	*df*	SS	MS	*F*	*p*	η²	Power
Within Groups							
Teaching Efficacy(TE)	2	4.21	2.11	6.18	.01*	.08	.89
TE x Treatment Group	2	2.11	1.06	3.11	.048*	.04	.59
Error	148	50.39	.34				
Total	152						
Between Groups							
Treatment Group	1	3.81	3.81	2.63	.11	.03	.36
Error	74	107.47	1.45				

Note. Sphericity assumption met (*Mauchly's W* = .98, *p* = .56), **p* significant < .05

Table 4

Within Subject Contrasts for Teaching Efficacy

Source		*df*	SS	MS	*F*	*p*	η²	Power
Within Group Contrasts								
Teaching Efficacy(TE)	Level 1 vs. 2	1	6.12	6.12	9.20	.00*	.11	.85
	Level 2 vs. 3	1	6.51	6.51	10.57	.00*	.13	.89
TE x Treatment Group	Level 1 vs. 2	1	.02	.02	.02	.88	.00	.05
	Level 2 vs. 3	1	3.38	3.38	5.49	.02*	.07	.64
Error	Level 1 vs. 2	74	49.2	.67				
	Level 2 vs. 3	74	45.5	.62				

Note. **p* significant < .05

Null hypothesis three stated there is no difference in student teachers' perception of their relationship with their cooperating teacher when cooperating teachers use a communication tool. Repeated measures analysis was used to test for differences in perceived level of importance of the relationship with cooperating teachers as seen by student teachers (see Table 5). This test produced a significance level of *p* < .00 (*Mauchly's W = .78*). In this case, the sphericity

assumption was not met; therefore, Greenhouse-Geisser adjustment was used. The significance level of $p = .16$ ($F = 1.88$) suggests there were no differences in the student teachers perceptions of their cooperating teachers current level of relationship exhibited throughout the student teaching semester during the three data collection points. The overall model was not significant (Between Groups, $p = .59$). The null hypothesis was held tenable and not rejected.

Table 5

Student Teacher Perceptions of Their Cooperating Teachers' Current Level of Relationship

Source	*df*	SS	MS	*F*	*p*	η²	Power
Within Groups							
Relationship Level (RL)	1.63	1.80	1.10	2.34	.11	.03	.42
RL x Treatment Group	2	1.45	.72	1.88	.16	.03	.35
Error	119.31	55.98	.47				
Total	123						
Between Groups							
Treatment Group	1	.52	.52	.29	.59	.00	.08
Error	73	129.23	1.77				

Note. Sphericity assumption not met (*Mauchly's W* = .64, $p = .03$) [1]Greenhouse-Geisser adjustment used

Table 6

Within Subject Contrasts for Relationship Level

Source		*df*	SS	MS	*F*	*p*	η²	Power
Within Group Contrasts								
Relationship Level (RL)	Level 1 vs. 2	1	2.17	2.17	2.46	.12	.03	.34
	Level 2 vs. 3	1	.09	.09	.22	.64	.00	.08
RL x Treatment Group	Level 1 vs. 2	1	2.88	2.88	3.28	.07	.04	.43
	Level 2 vs. 3	1	.60	.60	1.47	.23	.02	.22
Error	Level 1 vs. 2	73	64.12	.88				
	Level 2 vs. 3	73	30.09	.41				

Further data analysis revealed through within subject contrasts no significance on treatment group and perceptions of relationship of the cooperating teacher by the student teacher (see Table 6). It should be noted that overall both the treatment group and the control group displayed a reduction of their perception of the relationship through this time series design.

Conclusions, Discussion, and Implications

Although the study did not reveal significant impacts upon teaching efficacy and perceptions of the relationship between student teachers and cooperating teachers through MANOVA data analysis, it should be noted that change between measurements of each dependent variable was evident in descriptive analysis. Whereas measurements for the control group from first to second measurements declined, measurements from second to the third measurement increased in total mean score. This trend for teaching efficacy is congruent with previous research (Knobloch, 2002; Roberts, et al., 2006). Respectively, the treatment group's mean score increased from the first to second mean score and declined from second to the third measurement. Although these measurements showed no significant differences, the analyses should be noted in reference to teaching efficacy and perception of relationship when implementing structured communication. It is surmised that through viable and proficient observations of successful teaching, beginning teachers can believe that they possess the ability in order to be successful in similar circumstances (Bandura, 1977, 1986; Schunk, 2004; Tschannen-Moran et al., 1998). Bandura (1986) stated social persuasion depends largely upon credibility, expertise, and trustworthiness of the persuader.

It is concluded that self-perceptions can be lowered if feedback is overly harsh rather than constructive and focused on specific performance criteria. Social persuasion is a direct experience through the cooperating teacher and student teacher relationship in regards to the communication evoked through performance appraisals. Through analysis of data for this study it was seen that there was no significant difference in overall teaching efficacy through the implementation of structured communication by the cooperating teacher. Both the treatment group and control group dropped in teaching efficacy from the first to the second measure but scores increased towards the third measurement. However, a difference was found in the comparison from the control group to the treatment group at the conclusion of the experience. This difference raises many conclusions and implications from this study. Because teaching efficacy is a form of self-efficacy, it is dependent of the perception of the individual of their perceived abilities. The difference shown in the data describes a lowered perception by the treatment group in which structured communication was invoked. It is surmised by the researcher through structured communication, individuals more discriminately judged their perceived abilities as opposed to those who did not consistently communicate with a cooperating teacher about many aspects of the field experience.

Another outcome for the difference in teaching efficacy could be surmised through structured communication, student teachers felt that their abilities were criticized which would lead to a lowered sense of teaching efficacy. Putnam and Borko (2000) stated it has been a struggle for teacher educators to understand how much knowledge and the kinds of environments which creates meaningful experiences. It was shown through mean plots that the control group from the first measurement to the last measurement showed an increase in efficacy. The

treatment group showed a decrease over that same measurement period. It is presumed that the intervention of structured communication may cause student teachers to be more grounded in their perception of their beliefs about teaching due to the implementation of structured communication during field experiences. Although communication should be an integral part of the cooperating teacher and student teaching experience, its impact should constantly be monitored and be made aware of to teacher educators and cooperating teachers of student teachers.

No significant difference was found in relation to student teacher's perception of their relationship with their cooperating teacher when a communication tool is used by cooperating teachers. It should be noted although not significant there was a difference in data reported by both groups. Data showed a decrease in mean scores by the control group from first measurement to the second measurement. Furthermore, data hen showed an increase from the second to the third measurement. The treatment group showed an increase from the first measurement to the second measurement in mean score whereby the control group's mean scores indicated a decrease in the perceptions of the student teacher on level of relationship exhibited by the cooperating teacher. Data for the treatment group showed a decrease from second measurement to the third measurement as the control group data also indicated an increase in mean score. Because of data exhibited in this study, although not significant the downward trend of both groups in relation to relationship between student teacher and cooperating should be further investigated.

Kasperbauer and Roberts (2007b) concluded that student teachers' perceptions of cooperating teachers' relationship level exhibited decreased throughout the student teaching experience. This study concurs with Kasperbauer et al., (2007b) through results exhibiting a downward trend in perceptions of relationships by student teachers of cooperating teachers. Fritz and Miller (2003) stated student teachers should "reflect on their daily concerns and receive feedback … communicate with other student teachers and supervisors" (p. 51). Communication is important in relationships and if the perception of the relationship erodes over time the impact of the sharing of knowledge and experience through it will lessen in meaning for student teachers.

In order to better understand the relationship and the efficacy levels held by student teachers about the variables of study additional research should be conducted. Further recommendations include research towards the implementation of structured communication during field experiences at other universities involved in teacher education. It is also recommended that preservice students be educated about communication received from supervisors during field experiences. In addition, further recommendations include educating cooperating teachers on proper methods of feedback towards student teachers in the field experience.

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Cooperating Teachers' Perceptions of Student Teachers' Learning Gaps in FFA, Leadership Development, SAE, and Program Management

Discussant Remarks by
George Wardlow, Professor, University of Arkansas

This paper addressed an important topic to the profession and was based on a well developed theoretical framework. The paper sought to describe deficiencies in student teachers' preparation for teaching roles, as perceived by experienced teachers who were serving in cooperating teacher roles. The authors calculated weighted discrepancy scores to a get measure of the difference between item importance and student competence on each item. This is an excellent approach because it increases the practical significance of any finding.
A review of the paper results in a couple of questions. While the authors noted that the study used a "descriptive design, and incorporated survey research," they labeled it as "ex post facto" research. My understanding of how the research community generally categorizes research is such that ex post facto research is built around variables which could be manipulated (ala experimental designs) but are not manipulated because the researcher was only able to collect the data after the time in which any differences in the variables might have occurred. In other words, in ex post facto research the researchers arrive on the scene too late to manipulate any levels of the independent variable. Research is labeled "descriptive" when it seeks to describe the status of phenomena, either past or present. A review of the research objectives and methodology reveals that this study sought to describe the status of characteristics possessed by student teachers, as perceived by their cooperating teachers, none of which were or could have been easily manipulated.

Cronbach's Alphas were calculated for each of the subscales of the instrument used, and returned very high values. The authors are to be commended for insuring internal consistency as a measure of reliability of the instrument. However, since the instrument was administered over varying times and conditions, we are left to wonder about the stability of the instrument. Instrument stability is another form of reliability which may be of concern in conditions such as these.

This study identifies several important deficiencies in the preparation of our teachers in FFA, leadership, SAE, curriculum alignment and standards, and reporting, and rightly suggests that these competencies may best be developed in an experiential setting. Emphasizing these concepts in the student teaching setting, as opposed to teaching them earlier in the programs of pre-service teachers, likely increases the potential for learning them. In their descriptions of the objectives and the findings, the authors appear to lump SAE with FFA. I understand that in recent years the profession has tended in this direction, such that many teachers, particularly more recent additions to the profession, accept without question the assumption that SAE is a function of the FFA. From a historical and philosophical perspective, I have a real concern with this. SAE programs are not a function of the FFA; they are, in fact, another laboratory through which to teach agriculture, just as the FFA is a laboratory. The profession should consider a revisiting of our historical and philosophical roots, particularly to the benefit of our younger members.

Perspectives of Successful Agricultural Science and Technology Teachers on Their Preparation to Teach Agricultural Mechanics

Discussant Remarks by
George Wardlow, Professor, University of Arkansas

This paper was of particular interest to me as I believe that laboratory-intensive courses provide the best opportunity to teach a set of skills which are beyond the technical content of the course; examples of those skills include critical analysis and problem solving. Agricultural mechanics courses certainly fit well into this category, if they are well planned and well taught. Therefore, a real strength of this paper was the very issue that it addressed: the nature of the quantity and quality of agricultural mechanics taught in Texas agricultural education programs. The authors did an excellent job of identifying the problem for the research, providing contextual background information and developing the theoretical framework. They should also be commended for their research approach: they wished to ascertain the opinions of successful teachers, so they asked them, through accepted interview techniques. Subjects were selected to participate in the study based on factors used to define "success." Then the study sought to determine what made them successful.

Several years ago this reviewer had the opportunity to work on a research project on educational excellence in vocational education with Dr. Gordon Swanson, truly one of the foundational philosophers of agricultural and vocational education. Dr. Swanson observed that most of the prior "excellence" studies had taken the approach of identifying factors which were supposed to define educational excellence and then go out into the field of practice and find examples of them. He posited that it was little wonder that researchers found what they were looking for. Dr. Swanson suggested that to expand our concept of excellence we should identify those teachers and programs which were widely regarded as "being excellent" and then go study them to find out why they were deemed to be so. I found his logic to be both refreshing and correct, and this study takes that approach.

There are a few questions which arise from this study's methodology. The study defined teacher "success" in agricultural mechanics based on participation in FFA career development events, increased student enrollments in courses, and whether new agricultural mechanics had been introduced into the school's curriculum. Should we not define teaching success in terms of some measurement of the content taught and of student learning? Or are participation in FFA, student enrollments, and courses taught adequate proxies for measuring success? The study also cited Erlandson (1993) to support their "prolonged engagement and persistent observation… to increase trustworthiness." But the authors describe little more than single interviews with subjects, while that the study was conducted over several months. I suspect that Erlandson was referring to prolonged engagement for each subject or group in a study.

The study found that Texas agriculture teachers lacked sufficient courses in mechanical technologies. This is an excellent finding which should fuel discussions within Texas and other states. One question for the profession is how much is enough? From my experience, degree program minimums become maximums when students do their scheduling. I suspect that undergraduate students could take more courses, but choose not to. Then, when they become

teachers, they note a lack of sufficient courses in their preparation. This is regardless of how many they actually have.

Structured Communication: Effects on Student Teacher – Cooperating Teacher Relationships

Discussant Remarks by
George W. Wardlow, University of Arkansas

This paper was a part of the same study as the other by the same authors reported in these proceedings. As such, many of my observations for this paper parallel my observations for the other paper. It is a topic of importance to the profession and the paper was well written. A review of the paper reveals an excellent theoretical framework that effectively builds several underlying theories with pragmatic needs of the profession. The design of the study appears to be sound, using a non-equivalent, control group design with repeated measures, described as a multiple time series design by Campbell and Stanley. The authors are to be commended for progressing beyond mere description and correlation toward an experimental design. Use of these types of designs, particularly when applied to field-based problems of practice is critical to increasing the credibility of agricultural education research among our peer professions. It was also refreshing to see an appropriate selection and effective treatment of the statistical tools used. A review of the paper reveals similar concerns with those of the other paper with regard to why instrument stability was not considered and interpreting trends in the data where no significant differences were found.

This paper also had several very interesting findings. Both the treatment and the control group noted a reduction in their perception of the relationship between cooperating teacher and student teacher over time. What is going on here? The relationship with the cooperating teacher is potentially one of the most important that a student teacher can develop as they transition into their professional role. What is the longer term effect of any degradation in this relationship over the course of the student teaching experience? The study also found a significant interaction between relationship level and the age of the student teacher. Older student teachers seem to feel that their relationships with their cooperating teachers don't diminish over time to the degree experienced by younger student teachers. Should age of the student teacher affect how the cooperating teacher manages the neophyte? Should it affect how teacher educators make decisions with regard to student teacher placement and supervision?

Exploring the Effects of Structured Communication on Teaching Efficacy of Student Teachers and Student Teacher – Cooperating Teacher Relationships

Discussant Remarks by
George W. Wardlow, University of Arkansas

This paper was a pleasure to read for at least two reasons: it was a topic of importance to the profession and it was well written. A review of the paper reveals an excellent theoretical framework that effectively builds several underlying theories with pragmatic needs of the profession. The design of the study appears to be sound, using a non-equivalent, control group design with repeated measures, described as a multiple time series design by Campbell and Stanley. The authors are to be commended for progressing beyond mere description and correlation toward an experimental design. Use of these types of designs, particularly when applied to field-based problems of practice is critical to increasing the credibility of agricultural education research among our peer professions. It was also refreshing to see an appropriate selection and effective treatment of the statistical tools used.

A review of the paper reveals a couple of concerns worth noting. The authors describe the process used to insure the internal consistency of the instrument via the Cronbach's Alpha, as a measure of instrument reliability. The resultant values are high. However, the instrument was administered multiple times over varying conditions. Philosophically, isn't instrument stability, as a measure of instrument reliability, also of concern? Further, while the data indicated no significant differences between the major variables of interest. The authors, however, state that "although not significant there was a difference" for selected variables. They continue to discuss purported "trends" in scores over time or level of treatment. "Not significant" is usually interpreted as any obtained differences between mean values are within the statistical margin of error. The authors are cautioned to not go beyond the results of their own analyses when making conclusions.

Those engaged in conducting student teacher programs can find several interesting conclusions and observations from this study which may affect how we administer such programs. Structured communication between cooperating teachers and student teachers apparently has little influence on their relationship with their cooperating teacher, or on their sense of teaching efficacy. This provides for a variety of potentially successful approaches to providing feedback for student teachers – there appears to be no "one best" way to do it. However, the authors also concluded that "self-perceptions can be lowered if feedback is overly harsh rather than constructive and focused on specific performance criteria." I presume that they mean any type of feedback. While I can only speculate as to what level of feedback reaches this threshold level, we would do well to consider that as positive advice in how we approach supervision.

Secondary Agricultural Science as Content and Context for Teaching

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The purpose of this philosophical article was to examine the role of agriculture in agricultural education. This philosophical argument, in many ways, re–examines the very discussions pondered by Dewey and Snedden almost a century ago, but applied only to agricultural education in contemporary times. In secondary agricultural education classes today, is agriculture the content learned, or the context in which learning occurs? In exploring this issue, theoretical bases and conceptual models for agriculture as content and agriculture as context are presented. It was concluded that there are theoretical bases for viewing agriculture both as content and context for teaching agriculture at the secondary level. Accordingly, a model is proposed that acknowledges that agriculture provides a rich context in which learning can occur. Today's agricultural educators teach both agricultural content and knowledge from other domains, thus yielding integrated curriculum. Learning occurs in complex social environments with teacher to learner and learner to learner interactions. Agricultural education has dual outcomes: a skilled agricultural workforce and successful citizens that are agriculturally literate, contributors in a democratic society. The two aforesaid outcomes are not mutually exclusive and that former students (and life–long learners) may move in and out of gainful employment in the agricultural industry throughout their lifetime. Based on this model, implications and recommendations are given.

Introduction

During the late 18th and early 19th centuries, the United States of America experienced a period of rapid technical advances and industrialization, often referred to as the industrial revolution. These advances led to significant changes in American society and culture. One such change was that the demand for skilled labor increased dramatically, while the demand for unskilled labor decreased (Roberts, 1957). The effect of this particular sociological shift was felt throughout society, including education.

A national interest in preparing skilled labor led to the establishment of federally–funded vocational education with the passage of the *Smith–Hughes Act of 1917*. This ground–breaking event resulted in a two–dimensional paradigm shift in secondary education: 1) education with a purpose of career preparation, as opposed to a more liberal focus, and 2) federal involvement in less than college-age education, which had previously been a primarily a state affair (Roberts (1957).

Although the need for vocational education was widely acknowledged, the purpose of such education was not universally accepted. In 1914 and 1915, John Dewey and David Snedden engaged in a battle of words over the purpose of vocational education (Dewey, 1914–1915/1977; Drost, 1977; Snedden, 1914/1977; Snedden & Dewey, 1915/1977). Snedden supported content–

centered curricula, focused on specific skill acquisition, based on established industry standards, and delivered separate from general academic content. Snedden's philosophy has been described as one of social efficiency, with roots in an apprenticeship model borrowed from Germany (Drost). In contrast, Dewey argued for an integrated approach in which vocational skills and academic content were blended, delivered in a context–rich environment, with a purpose of developing transferable life skills. Snedden's philosophy resonated with policy makers and he, along with his protégé Charles Prosser, were instrumental in crafting the Smith–Hughes Act, thus laying the groundwork for nearly a century of vocational education, now referred to as career and technical education (CTE).

Today, American society is changing again (or perhaps has already changed). Beyond the industrial revolution and industrial age, Americans are now living in the information age, in a global society, and in a transitioning economy (Friedman, 2005). These modern times are characterized by incomprehensible amounts of information that grows exponentially each year (Gardner, 2006). Labor projections continue to forecast a growth in professional, service, and information–related careers and a decrease in production–related and agriculturally–related careers (US Department of Labor, 2005). Much of the projected employment growth will be in jobs that require college degrees (Kirsch, Braun, Yamamoto, & Sum, 2007), and changing jobs throughout a career (i.e. career mobility) is relatively common (Brown, 1998). In short, just as the industrial revolution had profound impacts on American society and education a century ago, today's economic and employment climates will have an impact on society and education. How will agricultural education respond to the changes? What roles can agricultural education play in educating the students of tomorrow?

Purpose

The purpose of this philosophical article is to examine the function of *agriculture* in agricultural education. This philosophical argument, in many ways, re–examines the very discussions pondered by Dewey and Snedden almost a century ago, but applied only to agricultural education in contemporary times. In secondary agricultural education classes today, is agriculture the *content* learned, or the *context* in which learning occurs? In exploring this issue, theoretical bases for agriculture as content and agriculture as context are presented; conclusions are drawn, and recommendations and implications are given.

Theoretical Framework

Agriculture as Content

From a content perspective, it is helpful to examine the foundation of CTE, namely the federal legislation that formed vocational education, which was the *Smith–Hughes Act of 1917*. This landmark legislation stated that "the controlling purpose of such education [agricultural education] shall be to fit for useful employment …[those] who have entered upon or who are preparing to enter upon the work of the farm or of the farm home" (Roberts, 1957, p. 615). The most recent federal framework is provided by the *Carl D. Perkins Career and Technical Education Improvement Act of 2006* (Perkins IV), which had the purpose 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). Although the latter had a broader purpose, from a legislative perspective the purpose of CTE is to develop the knowledge and skills required for successful employment in a given industry.

In congruence with federal legislation, Pratzner (1985) purported that the traditional implementations of CTE focus on content designed to meet the needs of the labor market. In other words, students enrolled in CTE programs "are seen as training for work" (p. 9). Rojewski (2002) further asserted that content–centered CTE addresses narrowly defined skills that are job–specific, which supported Pratzner's earlier contention that content–centered CTE focuses on "entry–level skill development for specialized jobs" and "serves the interests of employers/jobs/society" (p. 8). Therefore, as a part of CTE and from a content–centered perspective, the purpose of agricultural education is to develop the knowledge and skills required for successful employment in the agricultural industry (Phipps & Osborne, 1988).

From a theoretical perspective, education with the purpose of acquiring knowledge and skills in preparation for a job aligns with behaviorism, in that learning leads to an observable change in behavior (Schunk, 2000; Skinner, 1953; Thorndike, 1932). Although Doolittle and Camp (1999) made an eloquent argument that cognitive constructivism can provide a theoretical framework for career and technical education, they acknowledged that behaviorism was the dominant learning theory applied in CTE. Further supporting a behavioral framework for content–centered CTE, Doolittle and Camp explained that curricula composed of knowledge and skills derived from industry standards are externally imposed on the learner. Behaviorism as the theoretical framework for content–centered agricultural education is also supported by examining contemporary teaching methods texts in agricultural education (Newcomb, McCracken, Warmbrod, & Whittington, 2004; Talbert, Vaughn, Croom, & Lee, 2007), which advocated instruction guided by objectives that view learning in terms of observable student behavior (Mager, 1997). In other words, successful learning in agricultural education yields students with an observable set of skills that can be used for successful employment.

Using a behaviorist framework for content–centered agricultural education, warrants a more in–depth look at skill acquisition. Schunk (2000) differentiated between *specific* and *general* skills. *Specific* skills are those abilities that apply to only certain disciplines, while *general* skills are applicable in a wide variety of settings. From an examination of some of the earliest secondary agricultural education curricula, it was obvious that the focus of the curricula was on the development of *specific* skills (Stimson, 1920). However, over the decades, it is fair to say that the curricula expanded to include more *general* skills and a broader focus (Newcomb et al., 2004).

Ohlsson (1996) advanced skill acquisition theory by examining the role of learning from errors. According to Ohlsson, most performance errors are caused by inappropriately applying general knowledge or skills in situations that require domain–specific knowledge or skills. In turn, learning occurs as the learner experiences a conflict between what they expected to happen and what was actually observed. This incongruence causes the learner to adjust this or her schema or "knowledge structures." As learners progress through this process, they move from being a novice to being an expert through what Schunk (2000) called the *novice–to–expert model*: "1) identify the skill to be learned; 2) find an expert … and a novice…; and 3) determine

how the novice can be moved to the expert level as efficiently as possible" (p. 260). In other words, if a learner wishes to gain expertise in a specific skill, he or she should study someone who already demonstrates expertise in that discipline.

In agricultural education, the teacher serves the role of expert, under which the novice will study. The importance of teacher expertise in agricultural education as it differs from teacher expertise in other discipline areas is echoed by Swanson (1971), who said that "the teacher must have extensive training and expertise in the occupation or technology which he teachers. Very little compromise can be made in the skills of the teacher if effective instruction is to take place" (p. 23). Specifically referring to vocational agriculture teachers, Roberts (1957) purported that "the many technological changes that are constantly occurring in agriculture require that a teacher of vocational agriculture possess a high degree of technical knowledge and skill acquired both in school and through experience" (p. 198). He went further to ascribe that agriculture teachers should have at least two years of on–farm experience. In summary, the teacher must be competent in industry–validated knowledge and skills (Prosser & Allen, 1925; Talbert et al., 2007).

Synthesizing the above–discussed aspects in viewing agriculture as the content in agricultural education yields a conceptual model (Figure 1) that explains the relationships between concepts. In begins with the agricultural industry, which provides the basis for the curricula taught and for teacher preparation. In turn, teachers utilize the curricula to provide industry–relevant instruction that results in observable skill acquisition. The end result is skilled workers that are ready for successful employment in the agricultural industry.

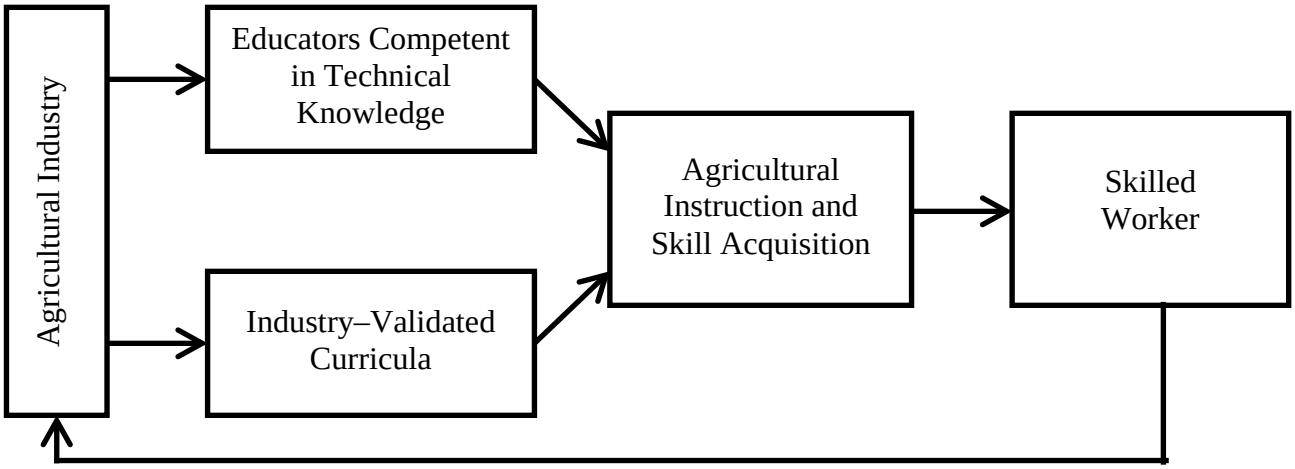

Figure 1. A content–based model for teaching agriculture.

Agriculture as Context

Current paradigm shifts in the purpose and philosophy of education as well as the nature and purpose of knowledge suggest a framework for thinking about agriculture as a valid *context* for secondary agricultural sciences education. The changes brought about with an increasingly global and rapidly advancing body of science and technology at the turn of the third millennium suggest a new paradigm for education as cultivating habits of mind (Gardner, 2006), specifically,

(1) the disciplined mind (or specialized thinking within a particular discipline), (2) the synthesizing mind (ability to make sense of large amounts of information from disparate sources), (3) the creative mind (ability to be ground breaking or innovative), (4) the respectful mind (the ability to understand different groups of people on their own terms), and the ethical mind (the ability to understand self and work within the perspective of a greater societal good). Thus, it has been asserted that the foundational charge of formal education systems and subsequently the policy–makers, who shape education in modern times, shift from a paradigm of education for social efficiency to education as cultivating the habits of mind that will be imperative for success and survival in the third millennium (Gardner).

Although not labeled as such, John Dewey's assertions of developing habits of mind have served as a foundation of agricultural education. Dewey (1938) purported that education should transcend beyond content, and rather, develop of an attitude for lifelong learning among learners as well as to prepare learners to be broadly educated contributors as a critical element in the foundation of a democratic society. The need for social efficiency through a highly skilled labor force at the turn of the twentieth century superseded the need for a liberally educated society of Americans with the passage of the Smith–Hughes Act. Yet, Dewey's foundations for education as a context or a basis for learning through experience has informed the philosophical foundation for agricultural education programs (Knobloch, 2003).

The conceptual model for secondary agricultural education programs as learning through classroom/laboratory instruction, supervised agricultural experience, and participation in the FFA organization further support the notion of agriculture as a context for learning in agricultural education. This three–circle Venn diagram illustrates the overlap between and among learning in the classroom, through supervised experience, and participation in youth programs, suggests a holistic view of education which aims toward education of the total person. In holistic education, the outcomes are the development and growth of the total student, and learning occurs within a particular context (Forbes & Martin, 2004). While the three–circle conceptual model for secondary agricultural education did not originate with holistic education in mind, the current structure of agricultural education programs aligns with most of the basic principles of holistic education, and thus, at least in the conceptual sense, one might argue that educators in secondary agricultural education programs ultimately view education from a *context*–rich perspective.

Agriculture as a context for learning is anchored theoretically in constructivism. Constructivism began not as a learning theory, but rather as a philosophical perspective regarding the nature of learning (Schunk, 2004). Modern tenants of constructivism, forming a post–structuralist psychological theory (Fosnot, 1996) describe learning as, "an interpretive, recursive, building process by active learners interacting with the physical and social world. It is a psychological theory of learning that describes how structures and deeper conceptual understanding come about rather than one that characterizes the structures and stages of thought or that isolates behaviors learned through reinforcement" (Fosnot, 1996, p.30). In particular, dialectical or social constructivists assume that knowledge is a derivative of the interactions between people and their environment (Schunk, 2004). Social cognitive theory (Bandura, 1986) and socio–cultural theory (Vygotsky, 1962) both support and contribute to modern notions of constructivism. Constructivist pedagogy then asserts the following (Doolittle & Camp, 1999):

learning should occur in authentic settings; learning should incorporate social interactions; content should be relevant to learners; content should be incorporated with the learner's prior knowledge, conceptions, and misconceptions in mind; formative assessments should guide the design of future learning; students should become self–regulated learners in the process; the role of the teacher is that of a facilitator; and teachers should encourage and allow for learners to represent content and learning in a diversity of ways. While career and technical education was not theoretically grounded in constructivist theories, it has been noted that scholarship, reform efforts, and policy and structural changes to career and technical education in recent years has at least indirectly relied on constructivist principles (Doolittle & Camp, 1999; Lynch, 2000; Pratzner, 1985).

Experiential learning has specifically been noted theoretically (Cheek, Arrington, Carter, & Randell, 1994; Hughes & Barrick, 1993; Roberts, 2006) and empirically in agricultural education (Stewart, 1997) as an underpinning to secondary agricultural education programs, and has been noted as a sound psychological framework for learning in secondary agricultural education (Knobloch, 2003). Under this framework, agriculture forms the context for learning in that learning involves the construction of knowledge, engages students in an inquiry into the content, and demonstrates an overall value beyond school (Newmann & Associates, 1996 in Knobloch, 2003). The integration of agriculture content into science curricula (Balshweid, 2002) and the integration of science principles into agriculture curricula (Enderlin, Petra, & Osborne, 1993) are two empirically based applications for a model of agriculture as a context for learning in secondary agricultural education. Both examples tested the model of a contextual approach to learning, and empirically, both student achievement (Enderlin et al.) and perceptions of the learning environment (Balshwied; Enderlin et al.), and general understanding of the integrated content increased (Balshwied).

A synthesis of the philosophical and theoretical paradigms as well as findings from the empirical literature above indicates a model for agriculture as a context for secondary agricultural education programs (Figure 2). In this model, knowledge in and about agriculture, across traditional technical agriculture content areas or sciences and other traditional academic areas guides but is also a construct of the interactions between and among the learners and the teacher. Teaching and learning is an interactive exchange in an authentic, experiential environment, and the outcomes of learning are a productive group of citizens equipped to think and solve problems as life–long learners contributing holistically to the aims of a democratic society, in particular one comprised of agriculturally literate citizens.

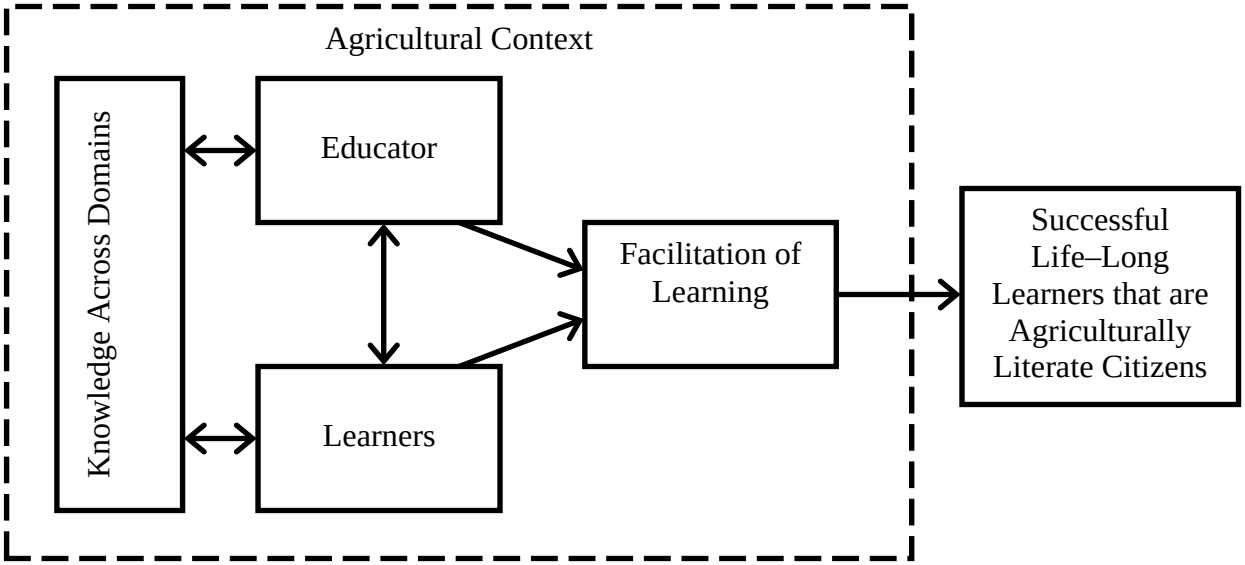

Figure 2. A context–based model for teaching agriculture.

Conclusions

Based on the philosophical discussion above, it was concluded that there are theoretical bases for viewing agriculture both a content and context for teaching agriculture at the secondary level. Conceptual models were created that propose relationships between variables in content–centered (Figure 1) and context–based (Figure 2) learning environments. The authors posit that both models are relevant and appropriate for contemporary agricultural education, and that this duality has existed for some time. Synthesizing the theoretical frameworks and models presented earlier yielded a comprehensive model that can serve to explain the benefits of conceptualizing agricultural subject matter as both the content and context for teaching (Figure 3). This model can further serve to advance the discussion of the philosophical foundations of agricultural education among educators, researchers, and philosophers.

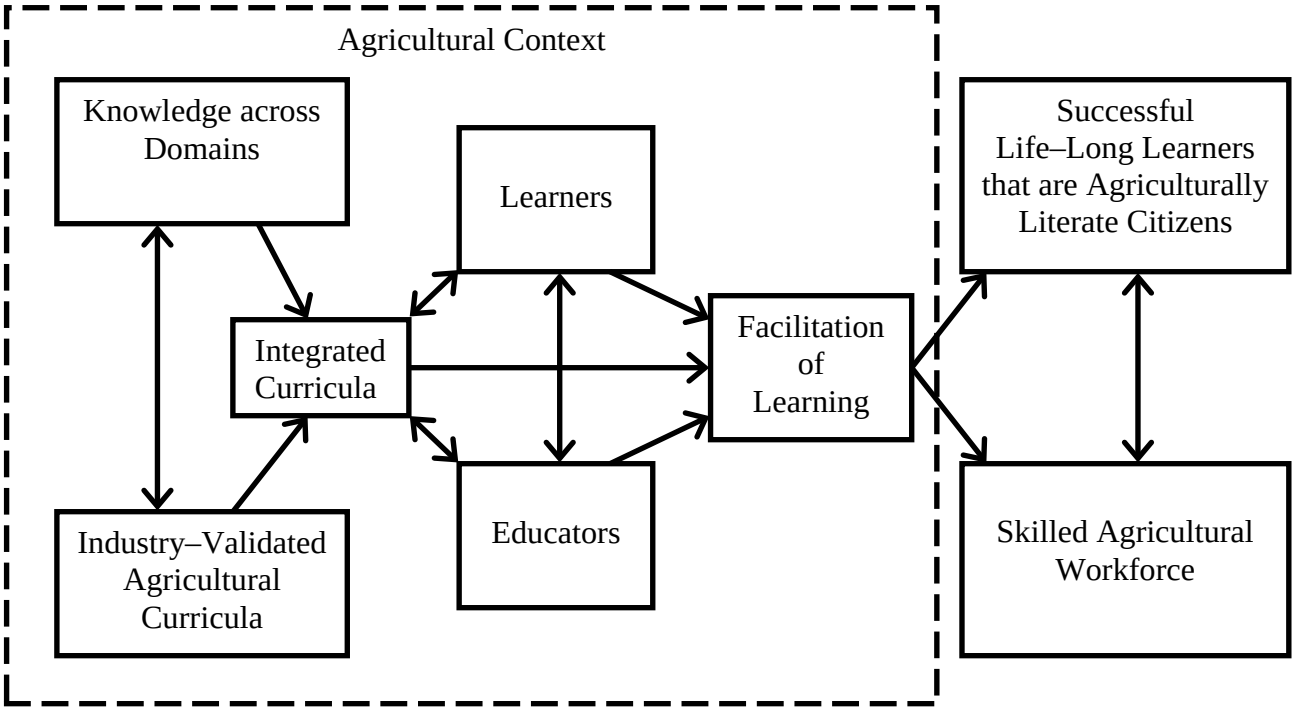

Figure 3. Conceptual model for using agricultural subject matter as a content and context for teaching.

The model first acknowledges that agriculture provides a rich context in which learning can occur. The model then recognizes that today's agricultural educators teach both agricultural content and knowledge from other domains. The two aforementioned knowledge bases are interrelated, thus yielding integrated curriculum. The model also embraces the constructivist nature of learning where learning occurs in complex social environments with teacher to learner and learner to learner interactions. Finally, the model concedes dual outcomes from agricultural education: a skilled agricultural workforce and successful citizens that are agriculturally literate, contributors in a democratic society. The model further recognizes that the two aforesaid outcomes are not mutually exclusive and that former students (and life–long learners) may move in and out of gainful employment in the agricultural industry throughout their lifetime.

As portrayed in the model, it is important to note, that the dual nature of agricultural education programs and historically dual purposes they served should not be considered an "either"/"or" argument as posited by Dewey and Snedden. The polarizing argument of whether programs were either behaviorist or constructivist by design has really served no end. As a profession, it is time to stop this polarization and begin examining, in a very inclusive and holistic sense, the communicated purpose, intended goals, and actual implementations of agricultural education programs, and how those align. In reality, today's agricultural education programs (as depicted in the model) are grounded in an epistemology that oscillates between cognitive and social constructivism based on the needs of individual learners (Doolittle & Camp, 1999).

Implications and Recommendations

It would appear that over the last 90 years the focus and of agricultural education has transitioned from a rigid application of the model proposed by Snedden (1977) to also embrace the holistic vision opined by Dewey (1977; 1990). Although data are not presented to substantiate this assertion, the model (Figure 3) and theoretical framework presented above provide a basis for acknowledging the duality in function of contemporary agricultural education programs. The transformation of agricultural education should not come as a surprise to proponents of community–based program planning (Phipps, Osborne, Dyer, & Ball, 2007). As communities have grown and evolved, the role of the respective agricultural education programs has subsequently transitioned. Further, as the educational climate oscillated towards a school–wide emphasis on core academic knowledge (i.e., math, language, science, etc.), agricultural education programs have also adjusted. The apparent adaptability of agricultural education programs should prove beneficial when the educational pendulum inevitably swings in a different direction.

Furthermore, the authors assert that while many agricultural education programs have adjusted, at least anecdotally, to the changing climate of schooling, students, and educational needs, many agricultural education programs have been slow to adjust curricula to align with one particular model or the other. For example, if a program asserts that it views agriculture as content for teaching secondary agricultural education, it must then examine whether it aligns itself with current agricultural education content as based on industry standards and occupations. Teaching the breeds of livestock, for example, while a viable production–based content area of the 1960's, might not be a current knowledge base for current employment in animal industries.

This assertion seems plausible, but is empirically void of data substantiating which of the proposed models are applied in contemporary agricultural education programs, or how they are applied. Therefore, it is recommended that research be conducted to assess the role(s) of agriculture in agricultural education programs across the country. It is further recommended that an examination of former agricultural education students be conducted to see how they are applying the knowledge learned in agricultural education programs.

The dual purpose model presented above (Figure 3) can be applied at a macro–level for a community or school. It can also be applied at a micro–level for an individual student. In fact, from a constructivist, learner–centered perspective, educators should place emphasis of the entire educational process at the student level. It is nearly impossible to accurately predict how students might apply concepts learned in an agricultural education classroom. For example, Maria and Julia are classmates that learned the fundamentals of mammalian reproduction as part of a lesson on dairy cattle management. If Maria eventually becomes a reproductive specialist at a dairy, the lesson served as content. While if her friend Julia chooses a vastly different career path, but applies the principles learned to understand her own pregnancy, the lesson provided both a transferable content and context. Agricultural educators do not have the luxury of defining how students apply what is learned, that falls on each student. Further complicating things, high school students likely do not know how they might apply something in the future.

The authors posit that agricultural educators have long recognized the divergent paths on which former students embark. However, the extent to which agricultural educators have

embraced the notion of using agriculture as a context in which to teach life's lessons is unknown, although empirical evidence in constructivism has supported contextual learning for a number of years, not only as a viable mechanism for meaningful learning, but one in which a rich diversity of students can be reached. Agricultural educators should reflect on their philosophical beliefs that guide their practice. From an empirical perspective, it is recommended that an assessment of agricultural educators' philosophies be gathered, and further analyses be conducted regarding the extent to which said philosophies guide existing program structures. In short, what do agricultural educators espouse as the conceptual framework for their programs? If they conceptualize agriculture as content for teaching, is the content they are teaching relevant to the knowledge, skills, and habits of mind required for an agriculturalist in the new Millennium? Further, if agricultural educators espouse agriculture as a context for teaching, do they teach using constructivist paradigms? Is contextual and experiential learning a solid foundation of their practice? Are they relevant to a rich diversity of students embedded in a meaningful learning environment? The authors recommend that agricultural educators from the middle school through postsecondary levels first examine at very real levels, the conceptual framework they explicate for agricultural education as well as the methods they emulate in carrying forth that framework.

The proposed dual–purpose model also has implications for policy makers. Recent federal legislation for Career and Technical Education (Perkins IV) acknowledges the potential contribution of agricultural education (and other CTE programs) to helping students learn academic content. However, the current legislation and policy do not fully embrace an outcome not connected with gainful employment related to a CTE area. If evidence is found that many "successful" agricultural education programs operate using agriculture as the context (i.e., Figures 2 or 3) with large portions of former students gainfully employed outside the agricultural industry, then policy makers and educators should collectively reexamine how legislation and practice relate. In other words, if policy is more Snedden–like (Snedden, 1977) and practice is more Dewey–like (Dewey, 1977, 1990), why does such a disconnect exist? Perhaps legislation could be constructed that provides greater flexibility in program planning, acceptable outcomes, and funding.

The dual–purpose agricultural education model also has implications for teacher–educators. Existing preservice teacher preparation curricula should be examined to determine if it appropriately acknowledges the multiple roles of agriculture in agricultural education programs. If needed, coursework and experiential activities may need to be re–conceptualized to more accurately align with the dual purpose model. Teacher–educators should also consider placing student–teaching interns in schools that demonstrate an effective use of agriculture as content and context.

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IDENTIFYING EARLY CAREER SECONDARY AGRICULTURE TEACHERS' NEEDS AND PREFERENCES OF SUPPORT

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Abstract

According to Joerger and Bremer (2001), an "experienced teacher" is nearly as important as "reading achievement" when examining the factors critical to student academic success. However, the rate of teacher attrition continues to rise and the number of teachers entering the profession can scarcely keep up with demand. The situation has resulted in the widespread deficit of experienced teachers in classrooms across the country. While many reasons are attributed to the hastened rate of attrition, career dissatisfaction is frequently cited. To better understand the experiences of early career teachers in Florida, an expert panel of 15 early career secondary agriculture teachers with one to three years of experience, reflected on their first years of teaching. Initially, the panel identified needs for assistance with their professional responsibilities. The highest levels of agreement achieved were through building program relations with various stakeholder groups and composing a respectful, productive learning environment. Secondly, experts identified their preferences for various forms of support and the panel had 100% agreement on desiring help with outside funding for their programs. Additionally, high levels of agreement were reached on collaborating with other teachers in their areas of expertise, including access to materials, resources and tools to aid in teaching and program management issues.

Introduction

According to Joerger and Bremer (2001), an "experienced teacher" is nearly as important as "reading achievement" when examining the factors critical to student academic success. The number of new individuals entering the profession continually falls below the current attrition and retirement rates (Kantrovich, 2007; Myers & Dyer, 2004) leaving the nation's classrooms under the care of early career teachers. Although teacher education programs continue to prepare new teachers, individuals are regularly pulled from industry to fill the gaps (Roberts & Dyer, 2004a). This situation shows the nation's classrooms are in an "experienced teacher" deficit (Stansbury & Zimmerman, 2000) and students are feeling the effects (Joftus, 2003).

While retirement is inevitable, an examination of the factors contributing to the staggering attrition rate of teachers in American schools may provide valuable information to reverse the trend. According to Joerger and Boettcher (2000), about half of all teachers leave the profession before the close of their sixth year and Smith and Ingersoll (2004) stated, "nearly 3 in 10 new teachers move to a different school or leave the profession all together at the end of their first year." Among the reasons exiting teachers attribute to departure, career dissatisfaction continues to be paramount (Alliance for Excellent Education, 2005; Wilhelm, Dewhurst-Savellis & Parker, 2000).

A myriad of factors are related to the dissatisfaction teachers feel toward their careers and many rise from the inordinately high expectations the profession has for its newest members. Early career teachers are often expected to perform at the same level as their more experienced counterparts and many receive some of the most challenging teaching assignments (Feiman-Nemser, 2001; Joerger & Bremmer, 2001; Worthy, 2005). Patterson (2005) went so far as to call the mismatch a form of "hazing." Since many early career professionals experience feelings of isolation, they fail to seek the help they desperately need (Hargreaves, 1994).

In Agricultural Education, researchers have found the less attention given to beginning teachers during the early stages, the less likely they were to return for another year (Greiman, Walker, & Birkenholz, 2005). Olson (2000) stated in order for teachers to develop to their fullest they must remain through their fifth or sixth year. With the current rate of teacher turnover and a number of retirements looming in the immediate future (Kantrovich, 2007), the profession cannot afford to lose teachers in the early stages of their careers (Smith & Ingersoll, 2004). Carefully crafted induction programs have shown immense potential to quickly socialize teachers (Joerger & Bremer, 2001) and ease the strain they feel from career-related demands. Other findings suggest quality induction is key to the retention of new educators (Moir & Gless, 2001; Smith & Ingersoll, 2004).

According to Smith and Ingersoll (2004), teacher mentoring was found to be one of the most prominent factors for keeping teachers in the profession and at the same school following the first year of teaching. Eastman and Williams (1993) examined the relationship between mentoring and the career development of agricultural education faculty and identified mentoring as related to an individual's sense of career satisfaction. They also cited mentoring programs as having two main functions: career (growth in a profession) and psychosocial (stronger sense of professional self-efficacy). Darling-Hammond (2000) mentioned teacher induction programs with a teacher mentoring component are making a difference and Holloway (2003) stated collaboration has perpetuated efficacious feelings in teachers.

Teachers who participated in an induction program, of which mentoring was a part, tended to remain in the profession longer (Smith & Ingersoll, 2004). Greiman et al. (2005) found agriculture teachers in the study received support from their school sites regarding ordinary teaching duties but assistance was compromised when it came to the additional responsibilities unique to their content area. Promising literature surrounding mentoring led to the development of this study. Regarding the present study, the research team has maintained a goal to implement a formal mentoring program. Rather than relying solely on the current state mandate of school appointed mentors, the team hopes to build a program to connect early career secondary agriculture teachers with those possessing more experience.

Conceptual Framework

Feiman-Nemser (2001) conceptualized teacher learning around three distinct periods in the early years of a teacher's career: preservice (prior to first position), induction (the first two to three years of career), and early career professional development (practicing teachers beyond induction). According to Feiman-Nemser, the lack of "connective tissue" between the three periods of teacher learning is often generated by the territorial wars between the university,

schools, professional organizations and everyone else. The lack of responsibility for a teacher's total learning creates a fragmented understanding of one's roles and responsibilities. While preservice education typically falls under the auspices of university teacher education in most content areas, university teacher educators in agriculture frequently extend influence over the induction and professional development periods as well (Myers & Dyer, 2005). The arrangement is a benefit as it strengthens the connection between the practical learning secondary teachers gain from their work in the classroom, and the theoretical knowledge they gain from teacher education faculty (Cochran-Smith & Lytle, 1999).

As applied to the present study, Feiman-Nemser offered six central tasks teacher induction programs should address to effectively support early career teachers in their quest for competent, confident performance. The tasks include guiding teachers in: "gaining local knowledge of students, curriculum and school context;" "designing responsive curriculum and instruction;" "enacting a beginning repertoire in purposeful ways;" "creating a classroom learning community;" "developing a professional identity;" "learning in and from practice" (p. 1028-1030). Although not yet the rule, the tasks provide a curricular ideal to which teacher educators can align all new teacher learning.

Steffy and Wolfe (1997) provided a six stage model of a teacher's career beginning with "novice," the preservice level, and continuing through that of "emeritus," retirement from a lifetime of educational service. "Reflection," "renewal" and "growth" are elements which move the teacher forward through the stages the longer he or she remains in the profession (Steffy & Wolfe, 2001). The level of a teacher's experience is critical to the academic success of his or her students (Feiman-Nemser, 2001; Joerger & Bremer, 2001) and providing high quality professional growth to meet their demands and the needs of their students has powerful implications. The support teachers often receive during the apprentice phase comes in the form of a district-delivered induction program based on mandates from the state department of education, of a locally-controlled staff development program, or even in the form of a university-sponsored event as would be part of a higher degree-seeking program (Clement, Enz & Pawlas, 2000). Regardless of sponsorship, Clement, Enz and Pawlas (2000) explained effective induction programs are immediate, based on the teachers' developmental needs, and are comprehensive. In addition, quality induction programs must have well designed orientations, workshops and seminars; provide information in a need to know basis at the right time; have a differentiated approach, and promote interaction.

Purpose and Objective

The purpose of this study was to gain consensus from a group of early career agriculture teachers regarding their perceptions of their greatest needs for professional assistance during their first year of teaching agriculture. Additionally, consensus was sought regarding the forms of assistance early career teachers thought would have been most helpful in their professional lives. An understanding of such issues has the potential to help professional development providers offer opportunities targeted toward the specific needs of this population (Joerger, 2002). The study's objective was to identify the major areas of need early career agriculture teachers face during their first year of teaching and their preferences for delivery of assistance.

Procedures

The Delphi technique is a communication tool used to bring together the individual views of a panel of experts, as they relate to a specific problem, for further evaluation and comment until consensus is achieved (Delp, Thesen, Motiwalla, & Seshadri, 1977; Finch & Lewis, 2003; Linstone & Turoff, 1975). In this study, the Delphi technique was used to identify early career secondary agriculture teachers' needs and preferences of support. As operationalized in this study, an early career agriculture teacher is one who is in the induction phase of teaching and has completed one to three years of teaching (Feiman-Nemser, 2001).

Linstone and Turoff (1975) describe Delphi participants as a group of individuals selected based on their expertise, and numbering between ten and 15 people. The population of interest consisted of the 32 early career middle and/or high school agriculture teachers in Florida. Following an initial request for participation, 15 teachers agreed to serve as members of the expert panel for the study. These induction teachers had completed anywhere from one to three years of teaching (Feiman-Nemser, 2001). Among the number were teachers who had been traditionally certified in agriculture, as well as those seeking alternative certification following completion of a degree program outside teacher education or a career in the agriculture industry.

The study featured a series of three rounds to achieve greater knowledge on the topic of interest (Dawson & Brucker, 2001). The first round, deemed to be most important to the Delphi's success (Linstone and Turoff, 1975), was mailed to the panel in late spring, 2006. The mailed questionnaire featured two open-ended questions, "During your first year of teaching, with which aspects of your professional responsibilities did you have the greatest need for assistance?" and "During your first year of teaching, which forms of assistance would have been most beneficial?" By utilizing a broad set of questions, the researchers were able to gain the participants' initial thoughts about the topics (Wilhelm, 2001) and draw on all related information they were willing to share (Jenkins & Smith, 1994).

Several follow-up reminders were distributed to encourage experts to return the round one questionnaire. Once the responses were received, researchers began the processes of summarizing and categorizing the data by identifying "all points, counterpoints, connections, and relationships" in the data (Wilhelm, 2001, p. 17). Frequency distributions were calculated on the responses and then formed into items for the round two questionnaire (Wilhelm, 2001).

The second round questionnaire was mailed to each participant in fall, 2006. Using a five-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree), participants were asked to mark their level of agreement with the items presented. Upon receiving responses from round two, the researchers retained all items with a mean score at or above the "agree" stage (4.00) to generate the questionnaire for the third round.

The third round of the Delphi provided participants the chance to reconsider their earlier responses with knowledge of the other panelists' perceptions (Dawson & Brucker, 2001). In the present study, a third questionnaire was mailed to participants in early spring, 2007. In an effort to fulfill the basic tenet of the Delphi technique by gaining consensus and beginning to draw

conclusions (Stitt-Gohdes & Crews, 2004), participants were again asked to identify their agreement with the statements provided.

Findings

Descriptive statistics were used to analyze the data generated from the study. Data from round one were analyzed using frequencies. Data from rounds two and three were drawn from Likert-type scales and treated as interval data. Means and standard deviations were calculated as appropriate, demonstrating the consensus reached by the panel on professional responsibility needs and forms of assistance desired during the first year of teaching.

Responses for round one were received from 13 of the 15 participants agreeing to participate. According to Dalkey (1969) and Linstone and Turoff (1975), this response rate meets the requirement for a Delphi to be valid. Question one, which asked teachers to reflect on the professional responsibilities for which they had the greatest need of assistance during their first year, generated a total of 22 items. The greatest number of respondents referenced a need for "completing and submitting paperwork on time," "developing classroom management techniques and strategies," "planning lessons," "integrating core academics into content area teaching," and "preparing the classroom environment."

Question two, which asked teachers to mention the forms of assistance they would have found most beneficial as a first year teacher, captured 24 items. Most responses were categorized according to "establishing a relationship with a mentor teacher," "access to another teacher who has expertise in classroom management," "access to another teacher who has expertise in working with FFA officers," and "receive training on classroom management techniques and strategies." No single item was identified by all respondents.

Table 1

Round One: *Question 1 - Assistance needed with Professional Responsibilities* (*n = 13*)

	Response	*f*
1	Completing and submitting paperwork on time	10
2	Developing classroom management techniques and strategies	8
3	Planning lessons	7
4	Integrating core academics into content area teaching	5
5	Preparing the classroom environment	5
6	Being part of the school community	4
7	Building program relations with community	4
8	Building program relations with parents	4
9	Preparing Career Development Event (CDE) teams	4
10	Building program relations with administration	3
11	Conducting fundraisers	3
12	Managing the land lab facilities	3
13	Managing time	3
14	Building program relations with prospective students	2
15	Building program relations with volunteers	2

Table 1 (cont.)

	Response	*f*
16	Communicating with students	2
17	Developing skills as a reflective practitioner	2
18	Establishing routines that assist in classroom organization	2
19	Identifying appropriate school personnel who can assist with specific teacher responsibilities	2
20	Managing student experiences in the land lab	2
21	Opportunities to learn about new teaching strategies	2
22	Starting a FFA chapter	2

Round One: *Question 2 - Forms of Assistance Needed* (*n = 13*)

	Response	*f*
1	Establishing a relationship with a mentor teacher	7
2	Access to another teacher who has expertise in classroom management	5
3	Access to another teacher who has expertise in working with FFA officers	4
4	Receive training on classroom management techniques and strategies	4
5	Access to another teacher who has expertise in advising a FFA chapter	3
6	Access to another teacher who has expertise in managing a land lab	3
7	Access to another teacher who has expertise in SAE supervision	3
8	Access to another teacher who has expertise in training CDE teams	3
9	Establishing a relationship with a mentor teacher in Agriculture	3
10	Opportunity to observe the instructional practice of model teachers	3
11	Access to Agricultural Education curriculum	2
12	Access to FFA resources	2
13	Checklist of state and national programs with respective due dates	2
14	Receive training on implementing educational software in instruction	2
15	Access to Career Development Event (CDE) resources	1
16	Access to outside funding sources	1
17	Access to someone who can help navigate the certification process	1
18	Access to Supervised Agricultural Experience (SAE) resources	1
19	Access to tools to incorporate core academics into content-area teaching	1
20	Opportunity to have individual supervision of teaching and feedback	1
21	Receive training in educational technology use	1
22	Receive training to manage CDEs	1
23	Receive training to manage FFA	1
24	Receive training to manage SAE	1

Round two asked respondents to state their level of agreement with the responses from the first round using a five-point Likert-type scale. 13 panelists returned questionnaires which the researchers promptly summarized. To gain a quantitative measure of participant agreement, means and standard deviations for each item were calculated and are reported in Tables 2 and 3.

The items in question one had means ranging from a 3.33 to 4.33. Of the original 22 items listed, the members of the expert panel gave ten a rating of “Agree” (4.00 and above).

Mean scores indicate the panel agreed “completing and submitting paperwork on time,” “building program relations with community,” and “building program relations,” were the professional responsibilities with which they had the greatest need for assistance.

Table 2

Round Two: *Question 1 – Level of Agreement with Assistance Needed with Professional Responsibilities* (*n = 13*)

	Item	*M*	*SD*
1	Completing and submitting paperwork on time	4.33	0.97
2	Building program relations with community	4.28	0.57
3	Building program relations with parents	4.22	0.43
4	Building program relations with volunteers	4.06	0.54
5	Developing classroom management techniques and strategies	4.06	1.21
6	Establishing routines that assist in classroom organization	4.06	1.06
7	Managing student experiences in the land lab	4.06	0.87
8	Managing time	4.06	0.94
9	Building program relations with administration	4.00	1.08
10	Building program relations with prospective students	4.00	0.77
11	Identifying appropriate school personnel who can assist with specific teacher responsibilities	3.94	1.11
12	Integrating core academics into content area teaching	3.94	1.06
13	Managing the land lab facilities	3.94	0.94
14	Preparing the classroom environment	3.89	0.90
15	Starting a FFA chapter	3.89	1.13
16	Conducting fundraisers	3.83	1.10
17	Planning lessons	3.83	1.15
18	Preparing Career Development Event (CDE) teams	3.83	1.10
19	Opportunities to learn about new teaching strategies	3.67	0.97
20	Developing skills as a reflective practitioner	3.65	1.00
21	Communicating with students	3.50	1.25
22	Being part of the school community	3.33	0.91

Note. Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree

The items in question two had means ranging from 3.71 to 4.65. Of the original 24 items listed, the mean responses indicated member agreement with 20. Based on mean scores, a high degree of agreement indicated “access to Agricultural Education curriculum,” “receive training to manage FFA, ” “access to another teacher who has expertise in advising an FFA chapter,” “access to another teacher who has expertise in classroom management,” “access to another teacher who has expertise in managing a land lab,” “access to Career Development Event (CDE) resources,” and “access to outside funding sources” were forms of assistance which would have been most helpful to them during their first year of teaching. A comprehensive list of scores for all items follows in Table 3.

Table 3

Round Two: *Question 2 – Level of Agreement with Forms of Assistance Needed* (*n = 13*)

	Item	*M*	*SD*
1	Access to Agricultural Education curriculum	4.64	0.79
2	Receive training to manage FFA	4.53	0.62
3	Access to another teacher who has expertise in advising FFA chapter	4.47	0.94
4	Access to another teacher who has expertise in classroom management	4.47	0.80
5	Access to another teacher who has expertise in managing a land lab	4.47	0.80
6	Access to Career Development Event (CDE) resources	4.47	0.80
7	Access to outside funding sources	4.47	0.62
8	Access to FFA resources	4.41	0.62
9	Establishing a relationship with a mentor teacher in Agriculture	4.35	1.00
10	Receive training to manage CDEs	4.35	0.70
11	Receive training to manage SAE	4.35	0.86
12	Access to another teacher who has expertise in training CDE teams	4.24	0.90
13	Receive training on classroom management techniques and strategies	4.23	1.03
14	Access to Supervised Agricultural Experience (SAE) resources	4.18	0.64
15	Checklist of state and national programs with respective due dates	4.18	0.88
16	Opportunity to observe the instructional practice of model teachers	4.18	0.95
17	Access to another teacher with expertise in working with FFA officers	4.12	0.78
18	Access to someone who can help navigate the certification process	4.12	0.70
19	Establishing a relationship with a mentor teacher	4.12	0.99
20	Access to tools to incorporate core academics into content-area teaching	4.00	0.71
21	Access to another teacher who has expertise in SAE supervision	3.94	0.97
22	Opportunity to have individual supervision of teaching and feedback	3.88	0.78
23	Receive training in educational technology use	3.71	0.92
24	Receive training on implementing educational software in instruction	3.71	0.99

Note. Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree

Using a forced-choice dichotomous instrument in round three, 15 experts identified their agreement or disagreement with the items retained from round two. Respondents were asked to state their level of agreement with the 10 items related to question one and the 20 items related to question two. The researchers calculated the mean from reported data to indicate the respondents' overall level of agreement for each item (Tables 4 and 5).

Question one showed the highest level of agreement on "building relationships with community" and "building relationships with parents"(93.33) followed closely by "building program relations with administration," "building program relations with prospective students," "developing classroom management techniques and strategies," and "establishing routines that assist in classroom organization" (86.67).

Table 4

Round Three: *Question 1 – Agreement with Assistance Needed with Professional Responsibilities* (*n = 15*)

	Item	Agree
1	Building program relations with community	93.33
2	Building program relations with parents	93.33
3	Building program relations with administration	86.67
4	Building program relations with prospective students	86.67
5	Developing classroom management techniques and strategies	86.67
6	Establishing routines that assist in classroom organization	86.67
7	Building program relations with volunteers	80.00
8	Managing student experiences in the land lab	80.00
9	Managing time	73.33
10	Completing and submitting paperwork on time	60.00

For question two, every panelist agreed "access to outside funding sources" was a resource which would have been beneficial to them during their first year of teaching. This was followed closely by "access to another teacher who has expertise in advising a FFA chapter," "classroom management," "managing a land lab," "opportunity to observe the instructional practice of model teachers," and "receive training on classroom management techniques and strategies (93.33).

Table 5

Round Three: Question 2 – Agreement with Forms of Assistance Needed (*n = 15*)

	Item	Agree
1	Access to outside funding sources	100.00
2	Access to another teacher who has expertise in advising a FFA chapter	93.33
3	Access to another teacher who has expertise in classroom management	93.33
4	Access to another teacher who has expertise in managing a land lab	93.33
5	Opportunity to observe the instructional practice of model teachers	93.33
6	Receive training on classroom management techniques and strategies	93.33
7	Access to Agricultural Education curriculum	86.67
8	Access to Career Development Event (CDE) resources	86.67
9	Access to someone who can help navigate the certification process	86.67
10	Access to Supervised Agricultural Experience (SAE) resources	86.67
11	Access to tools to incorporate core academics into content-area teaching	86.67
12	Receive training to manage FFA	86.67
13	Receive training to manage SAE	86.67
14	Access to FFA resources	80.00
15	Receive training to manage CDEs	80.00
16	Checklist of state and national programs with respective due dates	73.33
17	Establishing a relationship with a mentor teacher in Agriculture	73.33
18	Access to another teacher who has expertise in working with FFA officers	71.43
19	Access to another teacher who has expertise in training CDE teams	66.67
20	Establishing a relationship with a mentor teacher	60.00

Conclusions/ Implications/ Recommendations

While many studies have addressed the needs of first year teachers, few have asked participants to reflect on their experiences after the first year. Moir's (1990) description of the first year teaching attitudinal phases provides insight into the intense feelings which surface during the year. Collecting data from a panel wrestling through those stages may potentially cloud the reality of the experience. Using time to lend perspective helped the researchers draw feedback rooted in the experience rather than the emotion. By asking teachers the format in which they prefer their assistance, all assumption regarding subsequent delivery of support is removed. Such an approach further strengthens the contribution of this study to the profession.

The findings for question one identified the professional needs the experts faced at the start of their careers. Based on the data, teachers perceived building program relations with various stakeholder groups to be an important professional responsibility and these feelings have been expressed by other participant samples in previous research (Garton & Chung, 1996; Joerger, 2002). A finding of this nature implies teachers quickly realize teaching is a political position and carries great value in society (Hargreaves, 1994). Teacher education must help teachers at the preservice and induction levels feel prepared to build a program's appeal with the community, parents, administration and prospective students.

The panel was also clear about their needs with classroom management and organization. Feiman-Nemser (2001) provided literary support for addressing these issues in induction programs, as early career teachers feel the pressure of maintaining an appropriate environment for learning. Creating a classroom community of students who are respectful of one another and the learning process was found to also be important to teachers mere weeks into their teaching (Washburn & Dyer, 2006), six months into their teaching (Joerger, 2002), as well as with a year or more of experience (Roberts & Dyer, 2004b). An awareness of these needs helps teacher education realize professional development programming offered to this group of teachers must focus on classroom-based subjects in addition to traditional FFA, SAE and program management topics.

Question two identified the experts' preferred forms of support. The panel overwhelmingly expressed their frustrations with the lack of resources to run their programs. Consistent with previous research (Washburn & Dyer, 2006) 100% felt monetarily ill-resourced and were compelled to pursue grants in order to fund their programs. Panelists also expressed a strong desire for greater access to resources, tools and training related to classroom teaching, FFA and SAE management. In the presence of inadequate resources, teachers are often faced with the choice to either lower their standards of how to manage their programs, or leave the profession all together.

According to Feiman-Nemser (2001), early career teachers have two basic responsibilities; to teach and to learn to teach. If beginning teachers are expending time and energy securing resources to run their programs, little time and energy will be left to construct the sound pedagogical foundations upon which careers are built. Anecdotal evidence in Florida supports legitimate concerns capital and operating budgets for agricultural programs are extremely limited. If progress is to be made toward teacher retention in Florida, agricultural

leaders must be equipped with empirical evidence secured through additional research to effect change with these resource-oriented concerns for professional development.

The need for access to accurate information regarding teacher certification is an issue of great concern for this panel. Florida gains a number of teachers from the agricultural teacher education program but it also has a tradition of hiring many agriculture teachers from other university programs, other certification areas, and the agricultural industry. Alternative certification is necessary for these teachers to gain a basic understanding of educational practice and to achieve the documentation required to retain their positions. Without a clear and uniform set of guidelines, many teachers seeking alternative certification become disheartened and leave the profession before receiving answers. In this unique situation, it may be necessary for teacher education and state staff to work with the state Department of Education to develop a state-wide process for districts to help teachers navigate the alternative certification process.

Building collaborative relationships with other teachers was of definite interest to the expert group. Having reliable access to a number of individuals was appealing to the group, especially in matters of FFA, classroom management, land lab and instructional practice. Panelists clearly valued the expertise of other teachers yet expressed hesitation about entering into a formal mentoring assignment. In a state where every school district appoints a mentor for each new teacher, the static nature of the assignment may have generated some apprehension. The possibility of entering into a mentoring relationship with another secondary agriculture teacher however gained greater approval lending merit to the Greiman et al. (2005) study. The profession must work to strengthen a collaborative culture among teachers in the state professional association. Teacher education can incorporate the names of expert teachers into course lectures to help preservice teachers gain an understanding of those with command over various agricultural education responsibilities. Additional research is merited to develop a deeper understanding of effective practice and level of implementation of collaboration between agriculture teachers.

"Induction happens with or without a formal program, and it is often an abrupt and lonely process" (Feiman-Nemser, 2001, p. 1030). A more comprehensive support program is required to support new teachers rather than solely relying on the "happy accidents" of new teachers who ask for help or the occasional expert teacher who offers it. The professionals responsible for teacher learning must actively work toward the evolution of a differentiated approach to beginning teacher support. The alignment of university teacher education faculty, state agricultural education staff, and the professional teacher organizations can provide a unified force to address each of the items identified.

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QUALITY INDICATORS OF SECONDARY AGRICULTURAL EDUCATION PROGRAMS

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Abstract

The National FFA Organization Board of Directors set a long-term goal of having 10,000 quality Agricultural Education programs by the year 2015. The current body of knowledge concerning the three components of Agricultural Education in regards to quality is not consistent. The purpose of this study was to determine quality indicators for instruction, SAE, and FFA according to 36 experts (agricultural education teacher educators, state instructional staff, and high school teachers) across the United States. The study utilized the Delphi technique to garner expert opinion about quality indicators in Agricultural Education. For instruction, Round Two resulted in 19 of the 87 quality instruction statements reaching consensus as defined by 100% of respondents agreeing with the inclusion of the item as an indicator. Eighteen of the 54 instruction statements in Round Three reached consensus to qualify as a quality indicator. For SAE, Round Two resulted in only two of the 46 quality SAE statements reaching consensus. In addition, 17 of the 46 quality SAE statements were determined not to be quality indicators. Four of the 26 SAE statements in Round Three reached consensus. Also, for FFA, Round Two resulted in 13 of the 65 quality FFA statements reaching consensus. Sixteen of the 65 quality FFA statements were determined not to be quality indicators of FFA. Six of the 36 FFA statements in Round Three reached consensus. This study is valuable in determining where each state is in terms of a national mindset.

Introduction

In July 2005, the National FFA Organization Board of Directors set a long-term goal of having 10,000 quality Agricultural Education programs by the year 2015 (National FFA Organization, 2005), commonly referred to as the 10 X 15 initiative. The management team of the 10 X 15 initiative defines quality programs as those programs meeting National Program Standards for Agricultural Education. Therefore, the first priority initiative was to develop and adopt National Program Standards for Agricultural Education based on the academic, technical, career, and life skills which are based on the integrated model of Agricultural Education (Sulser, 2007).

The current body of knowledge concerning the three components of Agricultural Education in regards to quality is not consistent. Historically, the national standards project, which took place during the mid 1970s, was used to identify both program and content standards for high school Agricultural Education programs as well as state staff, teacher education, and adult education standards. The format of the standards allowed the evaluator to record observations and recommendations in addition to whether the program was exceeding the standard, meeting the

standard, or not meeting the standard (Standards for Quality Vocational Programs in Agricultural/Agribusiness Education, 1977). Following the development of these national standards, many states developed quality standards for use at the state level (Camp & Crunkilton, 1985).

Currently, several states have standards and quality indicators to improve or measure the quality of the agriculture program. However, these standard and quality indicator forms are self-administered and voluntary. In addition, the standard and quality indicator forms differ from state to state. For example, Indiana's and Missouri's forms consist of 12 and 13 standards, respectively. Both have quality indicators for each standard which are accompanied by a Likert-type scale. To meet the standard, the quality indicator ratings must add to or exceed the number provided for the standard (Purdue University, 2005; Missouri Department of Elementary and Secondary Education, n. d.). Wisconsin's form, on the other hand, consists of 25 standards. Each quality indicator can be checked as either meeting the standard, approaching the standard, or not meeting the standard (Wisconsin Department of Public Instruction, n. d.). Furthermore, Utah's form consists of 15 standards and a Likert-type scale for quality indicators; however, the form does not convey whether the standard is met (Utah Office of Education, 2006). Illinois' form, on the other hand, has eight standard areas with indicators. Each indicator provides a certain number of check marks depending on the magnitude of which the program is meeting the indicator. The checks are summed and the program is provided funding based on the number of checks received (Illinois Agricultural Education, n. d.). One commonality in the standards was an organization lens for sorting standards areas.

Agricultural Education in public schools has long been associated with three integral, intra-curricular components (Dailey, Conroy, & Shelley-Tolbert, 2001; Dyer & Williams, 1997; Hughes & Barrick, 1993; National FFA Organization, 2003; National Research Council, 1988; Talbert, Vaughn, & Croom, 2005). The lens for viewing this study about program standards was the three integral, intra-curricular components of Agricultural Education. The three components are conceptualized by a Venn diagram consisting of three overlapping circles titled instruction, supervised agricultural experience (SAE), and FFA (National FFA Organization, 2003). According to Croom (2007), the three components associated with Agricultural Education originated at different times throughout history. The limitation to this conceptual model lies with the 10 x15 initiative, as one of the task forces is looking as alternative models. Therefore, the three circle model is more representative of traditional programming.

A review of research literature was also conducted to see of scientific evidence were present in determining what would constitute a quality indicator. The review revealed the studies did not directly address the research question, and if some form of indicator could be extrapolated, the findings were inconclusive as a whole. The bottom line is that literature the three components of Agricultural Education in regards to quality is not consistent and total program quality has not been defined consistently or scientifically. Several states have developed program standards and quality indicators; however, most of these self-administered evaluations are voluntary and vary from state to state. The National Council for Agricultural Education and The National FFA Organization developed LPS in an effort to produce quality Agricultural Education programs. In addition, the 10 X 15 management team's goal is to define quality programs as those programs meeting the National Program Standards for Agricultural Education. Therefore, the management

team has worked to develop National Program Standards for Agricultural Education. With all of these different definitions of quality, what do the experts in the profession perceive as a quality Agricultural Education program?

Purpose and Objectives

The purpose of this study was to determine quality indicators for instruction, SAE, and FFA according to experts (agricultural education teacher educators, state instructional staff, and high school teachers) across the United States. To fulfill this purpose, the following objectives were developed: 1. Determine what constitutes quality instruction according to experts in the profession, 2. Determine what constitutes quality SAE according to experts in the profession, and 3. Determine what constitutes quality FFA according to experts in the profession.

Methodology

This national study was descriptive in nature and utilized the Delphi technique. The Delphi technique is used as a method of structuring group communication (Linstone & Turoff, 1975). Stewart (2001) stated that the Delphi technique is extremely useful in professional education for gaining knowledge that is often not verbalized.

The study was composed of an expert panel (n = 36) of Agricultural Educators. According to Stitt-Gohdes and Crews (2004), "careful selection of the panel of experts is the keystone to a successful Delphi study" (p. 60). Delbecq, Van de Ven, and Gustafson (1975) reported that a higher proportion of quality acceptable solutions are produced when the group is more heterogeneous rather than homogeneous.

The panel consisted of 12 teacher educators, 12 members of state instructional staff, and 12 high school agriculture teachers all representing the six National Association of Agricultural Educators' (NAAE) regions. To ensure an equal national representation, the six NAAE regions were utilized because of their smaller size when compared to other region structures in the profession. Each group of 12 was comprised of two representatives from each of the six NAAE regions. Leadership within in the profession was a key criterion in ensuring the panelists had an national scope in responding to the questions. The criterion for high school teacher selection was NAAE outstanding young member, outstanding teacher, or outstanding middle/secondary program award recipients from the past three years or NAAE board members from the past three years. The criterion for teacher educators and state instructional staff was a minimum of three years of leadership experience. For this study, leadership experience was defined as current or past membership on the Council, National Association of Supervisors of Agricultural Education (NASAE) executive committee, American Association for Agricultural Education (AAAE) board of directors, National FFA Board of Directors, and tenure for teacher educators. Selection was also based on proportion of gender in each of the categories to taken into account what has traditionally been a male-dominated profession.

This study utilized the Delphi Conference form. According to Dillman (2000) open-ended questions receive more complete answers with the use of email questionnaires when compared with paper questionnaires. The researcher verbally invited the experts to participate in this study

via the telephone. Following the phone invitation, experts received a letter thanking them for participating and summarizing the phone invitation. As suggested by Dillman, a pre-notice email was sent three days prior to each questionnaire reminding the participants about the upcoming round. Panel members received an email from the researcher containing a hyperlink to access the questionnaire for each round. The initial questionnaire was developed by the researcher and was constructed in web format. Both face and content validity were established by a panel of experts of Agricultural Education and related faculty. Dalkey (1969) stated that a reliability of .7 or greater can be achieved when the expert panel consist of more than 11 members. Having 36 expert panelists for this study should contribute to reliability.

The following open-ended questions were included on the Round One questionnaire:

- What are specific indicators of quality instruction in a school based Agricultural Education program?
- What are specific indicators of quality SAE in a school based Agricultural Education program?
- What are specific indicators of quality FFA in a school based Agricultural Education program?

The responses from Round One were categorized using a modified version of the open-ended question coding technique developed by Montgomery and Crittenden (1977). After the responses to Round One (n = 31; 86.11% response rate) were categorized, the Round Two questionnaire was developed and distributed. The Round Two questionnaire asked participants to rate each statement using a five point Likert-type scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, and 5 = Strongly Agree. Round Two had a response rate of 86.11%. Round Three had a response rate of 83.33% and sought to determine consensus. Round Three had participants indicate either agree or disagree for each item. Items from Round Two that received a score of “4” (Agree) or “5” (Strongly Agree) by 100% of the respondents reached consensus and where identified as quality indicators. Items from Round Two that received less than 75% of the respondents scoring the item as a “4” or “5” were rejected as indicators and were therefore removed from the study. Literature is unclear on a proper cut-off for consensus. The researchers concluded the likelihood of agreement being reached with 25% or more being neutral or disagreeing would be slim. Therefore, the items on the Round Two questionnaire that did not reach consensus, but had more than 75% of the respondents scoring the items as a “4” or “5,” were used in Round Three. The Round Three questionnaire was developed and included the individual’s score, the group’s mean score, and the standard deviation for each item. Participants were merely asked if they agreed or disagreed that an item should be a quality indicator. Round Three used similar benchmarks for consensus. If an item reached 100% agreement, it was included as a quality indicator. If 75% or less agreed it should be included, the item was thrown out of the study.

Round Four had a response rate of 85.71% and sought to determine if semantics contributed to disagreement on Round Three statements. Only participants who disagreed with the inclusion of an item from Round Three participated in Round Four. Participants were asked if changing the wording of the item would change their agreement on inclusion as a quality indicator. If they agreed that they would include the indicator if a change were made, they were then prompted to

explain how the indicator would need to be changed. The Round Four questionnaire was developed.

Findings

Objective one sought to determine what constitutes quality instruction according to experts in the profession. Two independent coders developed 87 quality instruction statements for the Round Two questionnaire. As illustrated in Table 1, Round Two resulted in 19 of the 87 quality instruction statements reaching consensus as defined by 100% of respondents marking either a "4" (Agree) or a "5" (Strongly Agree). Fourteen of the 87 quality instruction statements were determined not to be quality indicators of instruction and removed from the study, as defined by less than 75% of the respondents marking either a "4" (Agree) or a "5" (Strongly Agree). The group was undecided on the remaining 54 quality instruction statements, meaning 99.9% to 75% of the respondents marked either a "4" (Agree) or a "5" (Strongly Agree). Therefore, those statements were included on the Round Three questionnaire.

Table 1
Instruction Quality Indicators and the Round of the Delphi in Which it Was Accepted

Item	Round Accepted
Assessment is authentic	2
Assessment is based on the instructional objectives	2
Students receive timely feedback on their performance	2
A qualified/ certified Agricultural Instructor	2
The teacher is involved in professional development	2
The teacher is organized and prepared	2
The teacher has a well planned teaching calendar	2
The program has community and parent/ volunteer support	2
Classroom management practices maximize time on task and minimize disruptive behaviors	2
Evidence of use of a variety of instructional strategies/ materials	2
The teacher actively engages students	2
Appropriate technology is used with instruction	2
A mix of classroom and laboratory instruction is used	2
An adequate budget is provided	2
The curriculum is up-to-date	2
The curriculum is planned in advance	2
Lesson plans are based on appropriate instructional objectives	2
Instruction supported by appropriate resources (financial, personnel, community)	2
The curriculum is relevant to the local community	3
The curriculum is contextual	3
Curriculum meets the needs of students	3
Instructional materials including textbooks, workbooks, visuals, etc. are up to date	3
Enrollment in classes is appropriate (not too large or too small)	3
The instructor has a healthy relationship with others	3
The teacher has a passion for teaching and working with youth	3
A teacher who is dedicated	3
Teacher has adequate time to plan instructional activities	3
The program has a supportive administration	3
An active industry advisory committee that meets at least twice per year to review curriculum, program priorities, and program management	3
An advisory committee is in use	3
The teacher emphasizes safety	3
Instruction that is hands on learning	3
The instructional program uses community-based resources	3
Instruction is student centered	3
School administrators are satisfied with instruction	3
Instruction occurs in appropriate facilities	3

Note. Items were developed in Round One; acceptance as an indicator started in Round Two

Table 2
Instruction Items Rejected as Quality Indicators and the Round in Which They Were Rejected

Item	Round Rejected
The curriculum applies to complex situations	4
A rigorous curriculum is in use	4
Curriculum integrates academic content with agriculture content	4
The local program/curriculum is in compliance with all local and state requirements	4
Curriculum serves multiple purposes (career preparation, college preparation, etc)	4
Instruction provides students with communication skills	4
Instruction provides students with the ability to function as a member of a team	4
Instruction in personal development	4
Instruction incorporates leadership development	4
Instruction helps to build multiple relationships (e.g. with school, community, adults)	4
Instruction is competency based	4
Instruction includes career development, exploration, awareness and preparation natural resources that spans 9-14 grade levels.	4
Program includes opportunities for including Supervised Agricultural Experiences for all students in all courses.	4
Assessment is holding students accountable and making them strive to reach a higher standard	4
Student work is recorded	4
The teacher is a member of professional organizations	4
A teacher who is personable	4
A teacher who has been recognized for quality teaching	4
The teacher has an archive of lesson plans	4
There is an alumni association or other support group	4
The program has a supportive faculty	4
Balance between other components (SAE and FFA)	4
Students have access to a course syllabus/guide/curriculum	4
A defined mission, goals, and vision for the program	4
Student progress toward attainment of competencies is well documented	4
The instructional program is articulated with post-secondary programs	4
The teacher uses a lesson plan	4
Teaching is geared toward the learning style and capabilities of the students	4[a]
Out of class instructional activities (such as homework, meetings, etc) are required	4
Student performance/mastery of topics taught	4
All Agricultural Education students maintain an SAE	4
Students take notes (have notebooks)	4
Students are satisfied with instruction	4
The advisory committee is satisfied with instruction	4
Teacher performance is assessed at an acceptable level by administration or peers	4
Reference materials are maintained on file in the department	4

[a] Would be included by the disagreeing expert if modified

Eighteen of the 54 instruction statements in Round Three reached consensus. The remaining 37 instruction statements all had an agreement percentage of 75% or better, meaning 75% or more of the participants marked a "4" (Agree) or "5" (Strongly Agree). Therefore, none of the instruction statements were rejected in Round Three. The participants who disagreed on the remaining 37 instruction statements received the statements on their Round Four questionnaires. Round Four sought to determine if semantics contributed to disagreement on Round Three statements. Only participants who disagreed with the inclusion of an item from Round Three participated in Round Four. Participants were asked if changing the wording of the item would change their agreement on inclusion as a quality indicator. If they agreed that they would include the indicator if a change were made, they were then prompted to explain how the indicator would need to be changed. One participant indicated the inclusion of one item if it was re-worded. The item, "teaching is geared toward the learning style and capabilities of the students" would be included if the wording was changed to, "teaching is designed to address individual student needs." In addition, Table 2 summarizes the items which were rejected and the round for which they were rejected.

Objective two sought to determine what constitutes quality SAE according to experts in the profession. Forty-six quality SAE items were developed for the Round Two questionnaire. As illustrated in Table 3, Round Two resulted in only two of the 46 quality SAE statements reaching consensus, as defined by 100% of respondents marking either a "4" (Agree) or a "5" (Strongly Agree) for that particular item. In addition, 17 of the 46 quality SAE statements were determined not to be quality indicators of SAE and removed from the study, as defined by less than 75% of the respondents marking either a "4" (Agree) or a "5" (Strongly Agree). The group was undecided on the remaining 27 quality SAE statements, meaning 99.9% to 75% of the respondents marked either a "4" (Agree) or a "5" (Strongly Agree). Therefore, those statements were included on the Round Three questionnaire.

As illustrated in Table 3, four of the 26 SAE statements in Round Three reached consensus. Of those, 2 (50%) items came from the SAE Characteristics group, 1 (25%) item came from the Records group, and 1 (25%) item came from the Supervision group. In addition, 1 of the 26 SAE statements was determined not to be a quality indicator of SAE, meaning less than 75% of the participants marked a "4" (Agree) or "5" (Strongly Agree) for that item. The participants who disagreed on the remaining 21 SAE statements received the statements on their Round Four questionnaires.

Table 3
SAE Quality Indicators and the Round of the Delphi in Which it Was Accepted

Statement	Round Accepted
SAEs are assisted (e.g. in the planning process) by instructor, parents, employers and other partners	2
Student is satisfied with SAE	2
Teacher has supervision time for SAE	3
Student has up-to-date records on SAE	3
SAEs involve goal-setting	3
A diversity/variety of SAE types is promoted	3

Note. Items were developed in Round One; acceptance as an indicator started in Round Two

Table 4
SAE Items Rejected as Quality Indicators and the Round in Which They Were Rejected

Item	Round Rejected
SAE is documented with pictures	2
SAE is a factor in determining student grades	2
Students are provided aid (e.g. finding funds, connecting with professionals, etc)	2
Students with paid placement or entrepreneurial SAEs compute tax records	2
SAE is in depth, encompassing all aspects of the project area	2
Students independently manage their SAE programs	2
Students have SAEs that reflect the community	2
A plan for career development must be developed that utilizes SAE	2
SAE is leading to some type of recognition	2
By end of first grading period, a plan for SAE should be in place for all students	2
A quality computerized record book is in use	2
A student's first year SAE should be designed to help students explore careers in agriculture	2
Interest surveys should be conducted for SAEs	2
SAE's should encourage the student to consider entrepreneurship as a career	2
Students have year round SAEs	2
By end of second grading period, all students should be engaged in SAEs	3
A quality records keeping implementation program is in operation	4
Recordkeeping time is allocated during class	4
Each student maintains a portfolio of their experiences with SAE	4
Parents are involved with their child(ren)'s SAE	4
SAE is supervised year-round	4
Agriculture teacher maintains accurate records of all SAE supervision	4
School administrators are satisfied with SAEs	4
Advisory committee is satisfied with SAEs	4
SAE is viewed as a program versus a project	4
All students are engaged in (have a) SAE	4
SAE program has evidence of growth	4
Training plans are used for placement SAEs	4

Signed SAE agreements are on file	4
All Students have an investment of time, energy and/or money	4
Opportunities exists for SAE's to be showcased	4
SAE includes skill development	4
SAE planning is based on agricultural content standards	4
SAE involves continuous instruction	4
SAE is taught as part of the curriculum	4
By end of second grading period, all students should be engaged in SAEs	4
Teacher is enthusiastic and informed about SAE	4
Students apply for related awards	4

Only participants who disagreed with the inclusion of an item from Round Three participated in Round Four. Participants were asked if changing the wording of the item would change their agreement on inclusion as a quality indicator. If a participant agreed he or she would include the item as a quality indicator if a change were made with the item, that participant was then prompted to explain how the indicator would need to be changed. For the SAE section, all items had at least one participant "disagree," indicating that he or she would not include the item as a quality indicator, even if there were the opportunity to wordsmith that item. In addition, Table 4 summarizes the items which were rejected and the round for which they were rejected.

Objective three sought to determine what constitutes quality FFA according to experts in the profession. After the implementation of a modified version of the Montgomery and Crittenden (1997) method of categorization, two independent coders developed 65 quality SAE statements for the Round Two questionnaire. As illustrated in Table 5, Round Two resulted in 13 of the 65 quality FFA statements reaching consensus, as defined by 100% of respondents marking either a "4" (Agree) or a "5" (Strongly Agree). Sixteen of the 65 quality FFA statements were determined not to be quality indicators of FFA and removed from the study, as defined by less than 75% of the respondents marking either a "4" (Agree) or a "5" (Strongly Agree). The group was undecided on the remaining 36 quality FFA statements, meaning 99.9% to 75% of the respondents marked either a "4" (Agree) or a "5" (Strongly Agree). Therefore, those statements were included on the Round Three questionnaire.

Six of the 36 FFA statements in Round Three reached consensus. The remaining 30 FFA statements all had an agreement percentage of 75% or better, meaning 75% or more of the participants marked a "4" (Agree) or "5" (Strongly Agree). Therefore, none of the FFA statements were rejected in Round Three. The participants who disagreed on the remaining 30 FFA statements received the statements on their Round Four questionnaires.

Round Four sought to determine if semantics contributed to disagreement on Round Three statements. Participants indicated two items that would be included if those items were re-worded. The item, "the Program of activities includes activities in the following areas: member development, chapter development and community development activities/events" would be included by the expert if the wording was changed to read, "among other activities, the POA includes activities in the following areas: member development, chapter development and community development activities/events" The item, "regularly scheduled FFA chapter business meetings are held" was accepted as written by the participant. Table 6 summarizes the items which were rejected and the round for which they were rejected.

Table 5
FFA Quality Indicators and the Round of the Delphi in Which it Was Accepted

Statement	Round Accepted
A dedicated and knowledgeable FFA advisor	2
Advisor is an active and certified teacher of agricultural education	2
Chapter advisor(s) are trained in leadership development	2
Support is present from administrators, other teachers, advisory committee,	2
Well-planned FFA chapter business meetings are held	2
FFA members have opportunities to develop communication (oral and verbal) skills	2
FFA members involved in activities which promote leadership development	2
The FFA chapter maintains accurate financial records	2
The chapter has a capable and trained officer team	2
Chapter officers and advisor meet periodically to plan the work of the organization	2
Chapter maintains accurate minutes of all meetings	2
Activities are designed to meet the needs of a diverse membership	2
All Agricultural Education students who wish to participate in FFA are accepted as members, no matter if there is an inability to pay dues.	2
The FFA chapter plans and conducts award and recognition programs	3
Instruction in personal and leadership development is provided for all FFA members	3
FFA serves as a connecting activity for SAE and Instruction	3
The local FFA chapter is in good standing with the state and national associations	3
The chapter has an accurate constitution and/or bylaws that is reviewed regularly	3
The local FFA chapter is student led	3
Regularly scheduled FFA chapter business meetings are held [a]	4

[a] accepted as-is by the disagreeing expert in Round Four

Note. Items were developed in Round One; acceptance as an indicator started in Round Two

Table 6
SAE Items Rejected as Quality Indicators and the Round in Which They Were Rejected

Item	Round Rejected
Students learn how to apply for various awards	2
Every FFA member being active in committee work	2
Chapter activities include areas of agricultural issues and events	2
All students enrolled in the Agricultural Education program are members of the FFA	2
All FFA members have a progressive growth plan	2
Every FFA member attending meetings	2
At least one FFA member attends National Convention	2
The FFA chapter provides competition at the classroom level	2
All members successfully apply for their Chapter FFA Degree	2
FFA members involved with support groups such as FFA Alumni and Booster/ parent clubs	2
Grade in Agricultural Education course is reflective of participation in FFA	2
The latest promotional literature, instructional materials, and personnel are involved	2
Leadership development skills, as defined by the 16 LifeKnowledge precepts, are developed for every student, every class, every day.	2
The chapter conducts a high number of extra-curricular activities	2
Large number of members run for chapter offices	2
Extended Contract for FFA advisor	4
Chapter advisor provides assistance to members in completing chapter and individual applications and reports, but does not complete the applications and reports for them	4
FFA members are satisfied with the FFA chapter	4
FFA members are involved in the planning and implementation of a challenging Program of Activities (POA)/ Program of Work (POW)	4
The Program of activities includes activities in the following areas: member development, chapter development and community development activities/events	4
The POA is distributed "widely" (to each member, administration, etc)	4
Regularly scheduled FFA chapter business meetings are held	4
All students participate in activities/events of the student organization	4
FFA members participate in FFA activities above the chapter level	4
Chapter members attend their state FFA convention	4
The Chapter provides community service opportunities for members	4
Chapter activities include areas of social activities	4
All FFA members participate in one or more of the following: proficiency awards program, CDE, FFA degree program, financial activities (fund-raising, etc.), community development, activities that promote safety/health, etc.	4
Members serve as officers at local, regional/area, state and national levels	4
The FFA chapter has the financial resources to support the POA	4
Chapter budget is communicated to members and administration as appropriate	4
FFA activities/events relate to the courses and topics included in the instruction	4

Teacher provides instruction about FFA in the classroom	4
The FFA chapter assists students to see and build relations with school, community, adults, and other students	4
Chapter has student recruitment program	4
Chapter officers are elected annually	4
Chapter uses a committee structure to plan and conduct its activities	4
Member dues are collected and submitted to the state association by the published deadline	4
Chapter maintains an active public relations/public awareness program	4
Mentoring exists from older to younger members	4
The chapter is involved in the school	4
Chapter keeps high standards for its members no matter what the situation	4
Chapter builds tradition so students feel they belong to a historically great organization	4
The chapter has a diverse representation of membership	4
Pride of membership is evident	4

Discussion

Of the 87 instruction statements generated in Round One, 37 were accepted as quality indicators and 14 were rejected leaving only 36 undecided statements. This conclusion is consistent with the research conducted by Roberts & Dyer (2004) who found effective agriculture teachers must first master teaching methods. The experts identified the characteristics of the agriculture teacher as an indicator of a quality instruction in an Agricultural Education program. This conclusion is consistent with Murry (1980) who stated that teacher characteristics affect program quality in secondary agricultural schools as well as the research done by the National Research Council (1988) which stated, "…quality teachers are the critical ingredient for quality programs…"(p. 34). The experts also identified a program's curriculum as a quality indicator of instruction. This conclusion is consistent with the research conducted by the National Research Council (1988) which recommended that adequate attention be given to the development of new curriculums as well as the research conducted by Cano (1990) which suggested that curriculum should be developed to challenge students at all levels of cognition. This implies that research from this study is consistent with known literature in Agricultural Education. It is recommended that state staff and teacher educators continue to promote this as a good practice.

The experts rejected 18 SAE items and only 6 accepted as quality indicators leaving 22 statements as undecided. This conclusion is consistent with the research that Boone, Doerfert, and Elliot (1987) conducted revealing that the some educators interrupted the Vocational Education Act of 1963 to mean that supervised practice was not needed. This conclusion also supports the finding that SAE is the smallest circle which Moore (2006) concluded for his lecture. The experts did identify the need for a diversity/variety of SAE types to be promoted and that agriculture teachers need to have supervision time for SAE. This conclusion is consistent with the research conducted by Steele (1997) which identified providing appropriate SAE opportunities for all students was the most important SAE practice followed by summer employment for agriculture teachers. The conclusion that the agriculture teacher has supervision time for SAE is also consistent with the finding from Camp, Clarke, and Fallon (2000) who

found that an effective SAE contained supervision by an adult. The conclusions lead to implications of disagreement in the profession and perhaps some larger phenomena existing. The recommendation is that more attention is needed to determine why agreement does not exist.

The experts accepted 19 FFA items as quality indicators. The expert panel identified that the FFA serves as a connecting activity for SAE and instruction, the chapter has an accurate constitution and/or bylaws, well-planned chapter business meetings are held, the chapter maintains accurate financial records, the chapter has a capable and trained officer team, chapter receives support from administrators, teachers, and advisory committee, parents, etc., hosting activities that are designed to meet the needs of a diverse membership, and the chapter maintains accurate minutes of all meetings as quality indicators of FFA. These conclusions are consistent with the recommended 11 essentials of a successful FFA chapter provided in the *Official FFA Manual*. In addition, the expert panel identified the characteristics of the advisor as an indicator of quality for FFA. This conclusion is supported by recommendation made by Phipps and Osborne (1988) that the chapter advisor plays a large role in developing a successful FFA chapter. The findings imply some agreement existing between this study and research. The recommendation is that the FFA findings should be supported as quality indicators.

Recommendation for Further Research

Because this study utilized a traditional lens of an Agricultural Education program (the three-circle model) as its conceptual framework, non-tradition programs that serve under-represented populations should be investigated to determine if the quality indicators align or should be reconstructed. Also, action research could be applied to local Agricultural Education programs in communities that support a traditional framework through the three-circle model. The quality indicators can serve as items in an instrument to garner the perspective of program stakeholders to determine to what extent the program is accomplishing these quality indicators. This research could then be used to inform program leadership (agriculture teachers, advisory committees, administrators) on areas of improvement and growth for the program. This would assist agriculture teachers in prioritizing activities and tasks, while hopefully meeting community needs through obtaining stakeholder perspectives.

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Discussant Remarks
Todd Brashears, Assistant Professor
Agricultural Education and Communications
Texas Tech University

Secondary Agricultural Science as Content and Context for Teaching

T. Grady Roberts, Assistant Professor, Texas A&M University
Anna L. Ball, Assistant Professor, University of Florida

This study analyzes the duality in the nature of agricultural programs at the secondary level. The authors provide a historical background for arguing that agriculture was originally designed to be taught as content in order to prepare a workforce ready to assume positions in the production, processing and marketing of our nation's agricultural products. In addition, the argument is made that agriculture is also used as the context in which to teach other educational competencies and in the process, educate the students about the role of agriculture in this country. I have often heard this presented as education "in" agriculture and "about" agriculture. The authors present a model demonstrating the role of agriculture as context and content.

The paper is well written and the thought process is easy to follow and interpret. Philosophical articles are not common to the profession and I commend both authors on addressing such a topic. Reviewing the paper raised the following questions.

- What is the role of research in further development and validation of the proposed model?
- Will programs be identified by the percentage they teach in each domain?
- Will graduates be surveyed to determine what was learned in each program?
- Will programs effectively plan to teach a portion of their content *in* agriculture and *about* agriculture?
- Are there programmatic differences based on school size, location or predominate local industry that sways content vs. context at the micro level?
- Will policy makers "jump ship" on funding CTE programs if we, as a profession, propose that we are not solely preparing a workforce in the agricultural industry?

Discussant Remarks
Todd Brashears, Assistant Professor
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Texas Tech University

Identifying Early Career Secondary Agriculture Teachers' Needs and Preferences of Support

Ann M. De Lay and Shannon G. Washburn, University of Florida

Research in the area of teacher induction and attrition is incredibly important as our profession continues to face teacher shortages nationwide. This research focused on teachers greatest needs for professional assistance during their first year of service with an additional objective of determining what forms of assistance would be beneficial during the same time. The researchers used a Delphi model of data collection and the methods were appropriate for the stated objectives. The data generated a list of items for the agreed upon by the panel for each research objective. This is a well-written paper with valuable data for use in preparation and support of teachers. The reviewer presents the following questions regarding this paper.

In regards to the population, is it possible to have divergent views based on the demographics of the group. No data was presented to validate group was homogeneous in nature. Of particular concern is traditional certification verses alternative certification. This could equate to: differences in age, differences in maturity and differences in experience level in the agricultural industry. All of these items might cause a split in the opinions expressed by the panel.

In the results section discussing Table 3, the reviewer was unclear of how data was collected? The researchers state that a "force-choice dichotomous instrument" was used to determine "level of agreement." Level of agreement would imply several response options available for the participant. Therefore, the statements seem to contradict each other. To better facilitate audience understanding, it might be helpful to provide an example of the questions used in this round along with the scale of measurement.

One issue that often arises during any type of survey research is an accessible population that can address the needs of the research questions. In this case, the overarching research question really has to do with what factors influence teacher attrition rates during the first few years of service. While the population used (current novice teachers) can provide insight to issues and struggles they have encountered, they cannot address the question of "Why did you leave teaching?" The reviewer would recommend the continuation of this research line by identifying teachers who left the field during their first six years with the intent of administering the same research instrument using the same methodology. The researchers could then make regional inferences to attrition rates among early career teachers.

Discussant Remarks
Todd Brashears, Assistant Professor
Agricultural Education and Communications
Texas Tech University

Quality Indicators of Secondary Agricultural Education Programs
Charles Cordell Jenkins III, Agricultural Education Instructor, Rolla Technical Institute, Missouri
Tracy Kitchel, Assistant Professor, University of Kentucky

This research paper adequately defines the need for a standardized instrument in evaluating Agricultural Education programs for the 10 X 15 project. The review of evaluation criteria from various states was of particular interest. How we evaluate program quality is an important line of research and the authors are to be commended for conducting this national Delphi study. The results should provide information to states and programs that will enable them to accurately assess where there program stands in regards to a national model. The review poses the following questions, some of which are philosophical in nature and are not addressed by this research, but are included only to promote discussion on the topic.

How did you handle non-response in rounds 2 and 3? This area is often overlooked or intentionally omitted from Delphi research but as a profession, we should address how to handle this issue. Is it necessary to have 100% agreement in round 3 to include an item? Several of the indicators are "double-barreled" responses. There is a difference in a teacher who is "organized" and a teacher who is "prepared." Those statements should be separated and evaluated on their own merits.

Should the National FFA Organization be the standard bearer for quality Agricultural Education programs? Where do we as a profession draw the line between local, state and national oversight to what is considered a "quality" program? What is the ultimate outcome of creating a national evaluation model for agricultural education programs?

The quality indicators created by this research provide the framework for assessing "quality programs." The actual evaluation of each program will be more difficult. Future research should address the question of how to evaluate each statement. For example, what will determine that the "teacher is involved in professional development"? Is one workshop in three years "involved?" What about one workshop every year?

FFA CHAPTERS INVOLVED IN CIVIC ENGAGEMENT DESCRIBE MEMBER ROLE AND CONTEXT OF LEADERSHIP ACTIVIITES

Robin Peiter Horstmeier, Brittany Wilkinson, Cameron C. White
University of Kentucky

Abstract

FFA chapter leadership activities were analyzed by chapter members participating in a year long civic engagement experience within their rural local community. This national study examined the context of FFA chapter leadership activities and the members' role in interactions within these leadership activities. Respondents tended to be white males, high school freshmen with one year in FFA. Few held a chapter office and a majority of respondents did not consider themselves to be a chapter leader. For context of chapter leadership activities, the greatest agreement was with personal (self) development, with the least focused on community. In the role of members in these chapter leadership activities, the strongest agreement among members was partners. Most agreement in the role-context matrix was in group development (chapter) with members viewing their role as objects. It is recommended FFA chapters design civic engagement activities to further engage youth as partners with adults. Similarly, leadership development activities should help youth gain skills that help them better understand self, interact with others, function effectively in groups, and provide leadership within the community. A greater focus with civic engagement leadership activities should enhance the community. Professional development for Agricultural Education teachers should be conducted to promote and develop effective civic engagement leadership activities at the chapter level. Future research should further analyze member gender, years of membership, officer experience, and leadership experiences related to role and context of activities.

Introduction

Leadership skills and behaviors of members in youth organizations have been widely examined. Specifically, much research has been conducted investigating the National FFA Organization. These studies have examined either the degree to which youth have acquired particular leadership life skills or the level within the organization at which the members have participated in leadership activities. Little attention has been paid to either the conceptual role that the young person plays in the day-to-day functioning of society or the context in which the leadership behaviors are performed. Research has suggested that the most effective leadership development programs engage young people in meaningful ways as they work as partners with adults in addressing real world situations.

As a premier youth leadership organization, FFA has prepared future leaders for local, state and national activities. In fact, the FFA mission states "The National FFA Organization is dedicated to making a positive difference in the lives of young people by developing their potential for premier leadership, personal growth and career success through agricultural education" (National FFA, 2005).

It is well documented that participation in FFA enhances leadership abilities. Researchers (Wingenbach & Kahler, 1997) have found a positive relationship between leadership skills scores and FFA participation. Further, Brannon, Holley and Key (1989) found Vocational Agriculture and the FFA had an impact on the success of many community leaders. These community leaders who had participated in vocational agriculture felt their leadership activities were effective in developing their leadership skills, contributed to their success, and have been of value to their careers regardless of their occupations (Brannon, Holley & Key, 1989).

Balschweid and Talbert (2000) reported that FFA members were more engaged in school and community activities and career preparations than either non-members or typical high school students. Scales and Leffert (1999) stated that youth organizations provide opportunities for success, a sense of belonging and safety, activities that are challenging, interaction and support from adults, leadership opportunities, and other interactions that contribute to the positive development and resiliency of youth.

Peiter Horstmeier and Nall (2005) examined youth leadership development opportunities in chapter activities for rural FFA members. Using a national, random multi-stage sampling technique, the researchers were able to generalize findings to the entire rural FFA chapter population. It was recommended that FFA chapter leadership development activities must continue to focus on the community. However, emphasis should be given to help young people gain skills that help them better understand self and interact with others. National FFA programs should be incorporated that emphasize effectively working in group and provide leadership within the community. This may be accomplished through chapter leadership activities such as civic engagement (Peiter Horstmeier, 2005).

Context of Leadership Activities

Ayres (1987) identified four key developmental phases through which individuals engaged in a leadership curriculum should progress (Figure 2.) First individuals must develop an expanded knowledge of self, that is, who they are, what they believe, and how they function. Next they move toward mastering skills necessary to work effectively with others. In the next phase, individuals refine their skills by working with groups or organizations. The final phase focuses on leadership within the context of communities, systems, and society. As the arena in which leadership is being practiced continues to broaden, individuals must use knowledge and skills learned at previous levels to be effective in the new context.

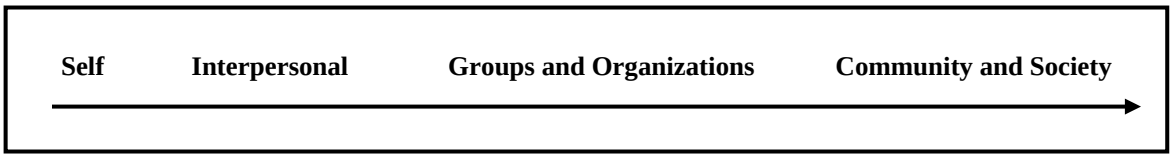

Figure 2. Context of Leadership Activity

Similarly, Austin (1996) offered a leadership model which focused on developing knowledge and skills first at the individual level, emphasizing that “before we can contribute to a

larger effort, it is imperative that we understand ourselves" (p. 118). However, group development included both the knowledge and skill related to interpersonal communication and interactions, as well as, the ability to participate in and understand group development, working together to achieve goals, and dealing with conflict. The third level in this model of leadership development focuses on community, recognizing that the ultimate goal of individual and group development is to serve the common good beyond the individual or organization.

In 2004, the National FFA Organization introduced a national leadership curriculum, LifeKnowledge. This curriculum's foundation is the 16 Precepts of National FFA Essential Learnings (Figure 1). These precepts focus around four key areas building on the area of Me, We, Do, and Serve. Developed by leadership experts, teacher educators, agricultural education teachers and agriculture industry leaders, these align very closely to the Ayres Context of Leadership Activities Theory (1987).

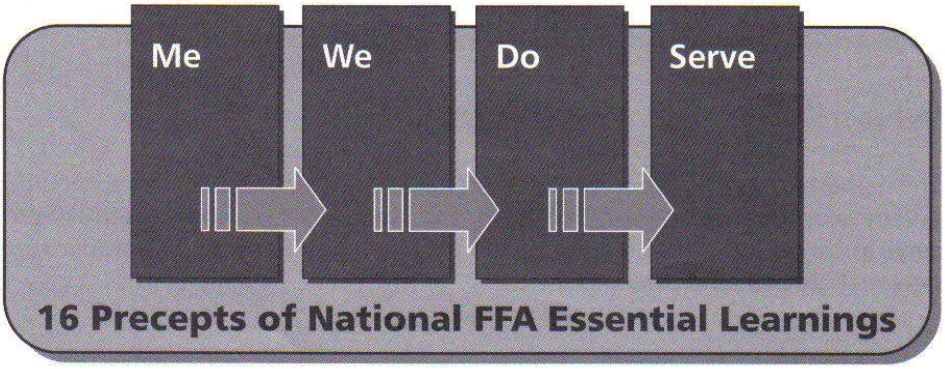

Figure 1. Precepts of the National FFA Essential Learnings.

Role of Youth in Society

Lofquist (1989) developed what he termed a "spectrum of attitudes" that adults may hold regarding the role of young people in society. The left side of his continuum (See Figure 1.) represents an attitude where young people are viewed as "objects," being told what to do because the adult "knows what's best" for the youth. As "recipients," young people participate in learning experiences that adults see as "being good for them." However, the real contributions of young people are seen as being deferred until some later date and learning experiences are seen as practice for later life. When youth are viewed as "resources", actions of young people have present value to the community and there is an attitude of respect focusing on building self-esteem and being productive. The Innovation Center for Community and Youth Development (2001) later added a characterization of youth as "partners" to Lofquist's original continuum. As partners, youth share leadership and decision-making roles with adults.

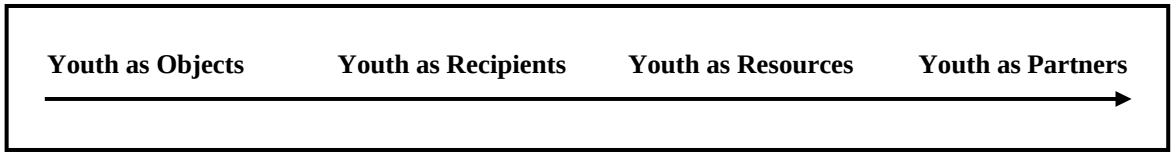

Figure 1. A Spectrum of Adult Attitudes toward Youth

The view that adults take toward young people tends to shape the nature of the leadership programs they design. In some programs, leadership is taught through formal routines that emphasize command and compliance. The leader is *in charge* and followers are objects to be directed. In other programs, youth run club meetings and organize events as practice for more significant roles in the community later in life. In these instances youth are recipients of programs designed by well-meaning adults. When programs involve young people as resources, youth grow, gaining knowledge, skills and building self-esteem from their involvement in service learning activities such as food drives and community clean-up campaigns while performing needed functions within their community. More recently, youth have been engaged as full partners with adults in making decisions and taking actions aimed at producing sustainable and vibrant communities.

Theoretical/Conceptual Framework

The Theoretical Framework of this study is based merging the two leadership theories of Lofquist (1989) and Ayers (1987) as created by Peiter, Rennekamp and Nall (2005). Lofquist's theory focuses on the interaction between youth and adults in youth leadership organizations. These interactions are identified by youth viewed as objects, recipients, resources, and partners. Ayers' (1987) theory examines the context of leadership activity of the organization, activities focusing on developing self, interpersonal, groups, and community. This conceptual map displays the relationship between the context of chapter leadership activities and youth leadership member role and is displayed in Figure 3.

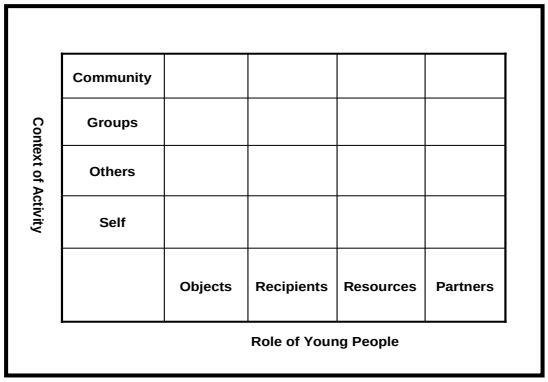

Figure 3. Conceptual Map for Theoretical Framework

Purpose/Objectives

The purpose of this study is to describe the leadership activities and youth-adult interactions of rural FFA members who participated in civic engagement leadership activities. Specific objectives of the study include:

1) Describe the personal characteristics of rural FFA members participating in civic engagement leadership activities.
2) Examine the context of chapter leadership activities after participation in civic engagement activities.

3) Describe the role of FFA members with youth-adult interactions at the chapter level after participation in civic engagement activities.
4) Analyze the strength between FFA member role and the context of chapter leadership activities.

Procedures

The population of this descriptive study was rural members of the National FFA Organization. For the purposes of this study, *rural* members were identified as those living in geographic region containing no city or town larger than ten thousand residents. All FFA chapters receiving a Civic Engagement Project Grant from the National FFA Organization in the 2006-2007 academic year were our sample (N = 15). The frame for this study was obtained from the National FFA Organization.

The FFA Leadership Questionnaire (Peiter, Rennekamp, & Nall, 2005) was utilized by the researchers to collect data for youth participation in leadership activities. The context of youth activities were identified by developing statements which reflect the potential roles FFA members engage in as they develop leadership skills moving from personal development to interpersonal development to organizational and group development to ultimately engaging in community and societal leadership (Ayers, 1987). Roles of youth in adult-youth relationships through leadership activities were also examined. Questions were developed which reflected the role in which FFA members were engaged through leadership activities which viewed them as objects, recipients, resources, and/or partners (Lofquist, 1989).

The instrument is based on a matrix integrating the context of leadership development in relationship to the roles of youth in the leadership activities conducted by FFA chapters. Four questions were developed in each cell for each of the 16 celled matrix. Each question related specifically to the member role and context of activity. For example, a cell 1 statement representing Self and Objects was "In my FFA Chapter….New members must participate in initiation activities." In contrast, cell 16 represents Community and Partners. A specific statement in this cell read "In my FFA Chapter…Members work side by side with local citizens in planning, conducting and evaluating meaningful community projects." Four statements were developed for each cell in the role-context matrix describing FFA leadership activities in the paired levels in the role-context matrix. A total of sixty-four questions were developed in this instrument, corresponding to the sixteen quadrants of the role-context matrix.

Each question began with the statement, "In my FFA Chapter…" and through responses FFA members measured their current state of leadership activities. Responses were measured using a four point Likert-type scale, based on 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

Validity and reliability of the *FFA Leadership Questionnaire* was established. Content and face validity of the instrument was established using a panel of experts. These experts were in the field of leadership development, current agricultural education teachers serving on the National Association of Agricultural Educators (NAAE) Board of Directors, University Extension staff, agricultural education pre-service teachers, and former FFA members. The

instrument was pilot tested with high school FFA members not included in the random sample. Reliability was established using Chronbach's Alpha and was reported for each construct specializing in leadership context of activity and member role. Scores included: Objects (α =71), Recipients (α=.85). Resources (α=.88), Partners (α=.86), Self (α=.72), Interpersonal (α=.88), Groups (α=.88), and Community (α=.88).

Dillman (2000) research design method was incorporated; with 15 FFA chapter advisors were notified of the opportunity to participate prior to the first mailing. Chapter advisor(s) were contacted and permission was granted by advisor, high school/middle school administrator, and member parents. Follow-up contacts were made with non-respondent FFA chapters. Each advisor administered the survey instrument to every FFA member in the chapter. This process resulted in 604 respondents from 12 FFA chapters with an 80% response rate. Early and late respondents were compared with no differences found. Research data were analyzed using SPSS 14.0 and descriptive statistics of frequencies, percentages, means, and standard deviations were reported.

Findings

The first objective focused on the personal characteristics of rural FFA members (Table 1). Over half of the respondents were male (*n* = 337, 55.8%) and 44.2% (*n* = 267) were female. Of those who reported ethnicity, over ninety percent (*n* = 539, 90.4%) were White, Non-Hispanic. Four percent (*n* = 26) were Black, 1.8% (*n* = 11) reported their ethnicity as Hispanic, 1.2% (*n* = 7) indicated Asian, and 2.2% (*n* = 13) of respondents reported their ethnicity as Native American.

In terms of level of education, one-third of FFA members were high school freshman (34.8%). Approximately one-fourth of the respondents were sophomores (*n* = 149, 24.7%), 19.7% (*n* = 119) were juniors, 13.6% (*n* = 82) reported their grade as seniors, and 7.3% (*n* = 44) of the respondents were middle school students. Over four out of 10 members (*n* = 210, 42.7%) were first year members of FFA, and 30.0% (*n* = 181) were second year members. Almost fourteen percent have been members for three years (*n* = 84, 13.9%), over one-tenth (*n* = 67, 11.9%) have been members for four years, 1.2% (*n* = 7) have been FFA members for five years, and 1.2% (*n* = 7) were six year members of FFA. In terms of leadership positions in the FFA, only 17.6% (n = 104) of the respondents reported serving as a chapter officer, while over eighty percent (*n* = 487, 84.2%) have not held an office in their FFA chapter. When members were asked if they consider themselves to be a chapter leader, 61.4% (*n* = 361) reported they did not consider themselves to be a leader in the FFA chapter.

The second objective described the context (Self, Interpersonal, Groups, Community) in which leadership activities are performed (Table 2). FFA members viewed leadership activities focusing on personal development (self) as the greatest (*M* = 3.25) context in which leadership activities are performed. Members viewed activities resulting in interpersonal development (*M* = 3.11) as the second highest, and leadership activities resulting in skills related to group development (*M* = 3.08) followed. Leadership activities focusing on community development were perceived as area of least involvement (*M* = 3.03) by FFA members involved in civic engagement activities.

The most frequent area was in agreement (*f* = 4533, 51.30%) for leadership activities in the context of self development. The least frequent agreement by respondents was also in self development, with respondents strongly disagreeing with statements in this area (*f* = 225, 2.55%)

Table 1

Personal Characteristics of Rural FFA Members

	Rural FFA Members (*n* = 604)	
	Frequency	*Percentage*
Gender (*n* = 604)		
Male	337	55.8
Female	267	44.2
Ethnicity (*n* = 596)		
White, Non-Hispanic	539	90.4
Black, Non-Hispanic	26	4.4
Native American	13	2.2
Hispanic	11	1.8
Asian	7	1.2
Grade in School (*n* = 604)		
Middle School	44	7.3
Freshman	210	34.8
Sophomore	149	24.7
Junior	119	19.7
Senior	82	13.6
Years in FFA (*n* = 604)		
1	258	42.7
2	181	30.0
3	84	13.9
4	67	11.1
5	7	1.2
6	7	1.2
Chapter Officer (*n* = 591)		
Yes	104	17.6
No	487	82.4
Chapter Leader (*n* = 588)		
Yes	227	38.6
No	361	61.4

Table 2

Context in which Leadership Activities are Performed

	Strongly Disagree		Disagree		Agree		Strongly Agree		Total			
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*M*	*SD*
Self	225	2.55	655	7.41	4533	51.30	3423	38.74	8836	100	3.25	.38
Interpersonal	344	3.93	1129	12.90	4435	50.66	2846	32.51	8754	100	3.11	.42
Groups	449	5.23	1050	12.25	4315	50.36	2755	32.15	8569	100	3.08	.39
Community	294	3.68	1274	15.93	4205	52.58	2224	27.81	7997	100	3.03	.48

1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

The third objective described the role of youth (Objects, Recipients, Resources, Partners) in leadership activities (Table 3). FFA members involved in civic engagement leadership activities viewed themselves as partners (*M* = 3.21) in youth-adult relationships to a greater degree than any of the other roles. Youth saw their role as resources (*M* = 3.17) in chapter leadership activities. FFA members identified their role in leadership activities as recipients (*M* = 3.06) and objects (*M* = 3.04) less than they viewed their role as partners and resources.

FFA members had the greatest agreement in that they were treated as partners (*f* = 4685, 54.52%) by adults. The least agreement was for members strongly disagreeing with partnership (*f* = 190, 2.21%) in the youth-adult partnership.

Table 3

Role of Youth in Leadership Activities

	Strongly Disagree		Disagree		Agree		Strongly Agree		Total			
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*M*	*SD*
Objects	480	4.87	1269	12.86	5302	53.75	2814	28.53	9865	100	3.06	.38
Recipients	419	5.11	1306	15.95	3969	48.46	2496	30.78	8190	100	3.04	.38
Resources	223	2.63	857	10.10	4507	53.13	2896	34.14	8483	100	3.17	.40
Partners	190	2.21	676	7.87	4685	54.52	3042	35.40	8593	100	3.21	.41

1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Objective four described the intersection of FFA member role to the context of the chapter leadership activities. Figure 4 displays how FFA members perceived their role in leadership activities related to the context of the chapter leadership activities. Members identified their leadership activities focused on group development (chapter level) and their member role as an object (*M* = 3.59). When members responded to survey statements regarding the role and context of their leadership involvement, they indicated the lowest agreement was in chapter leadership activities focusing on others and resources role-context matrix (*M* = 2.84).

Context of Activity				
Community	2.94	2.99	3.11	3.12
Groups	3.59	2.98	3.23	3.17
Others	3.30	3.21	2.84	3.08
Self	3.14	3.30	3.28	3.07
	Objects	Recipients	Resources	Partners
	Role of Young People			

1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Figure 4. Matrix Showing Intersection of Role and Context

FFA members responded to statements which identified the relationship between the roles of youth in youth-adult partnerships within the context of FFA chapter leadership activities (Table 4). Frequencies, percentages, means and standard deviations were expressed for each group of statements in the role-context matrix.

FFA members perceived their role and context as objects and group (*M* = 3.59). This indicates that in the objects and groups role-context matrix, members viewed activities which focused on the role of members as objects (adults tell youth to do the activity because it is good for them) in the context of leadership development activities ranging within group development (committee work). The greatest celled percentage was in the partners and groups role-context matrix cell (*f* = 1223, 57.55%).

FFA members involved with civic engagement leadership projects responded they had the least agreement with statements indicating their role was recipients and others in the context of group development (*M* = 2.84). The lowest cell with the least percentage in the role-context matrix was in role of partners (youth and adults are treated equally) and the leadership context of self development. Respondents reported they strongly strong disagreed (*f* = 24, 1.09%) with the statement the least of the other 15 role-matrix cells.

Standard deviations showing the least variance was in the role-context matrix cell of objects and groups (*SD* = 1.4). It should be noted this is consistent with the mean scores reported in Figure 4.

Table 4

Role of Members and Context of Leadership Activities in Civic Engagement FFA Chapters

	Strongly Disagree		Disagree		Agree		Strongly Agree		Total			
	f	*%*	*f*	*%*	*F*	*%*	*f*	*%*	*f*	*%*	*M*	*SD*
Objects/ Self	122	5.59	238	10.90	1044	47.8	780	35.71	2184	100	3.14	.54
Objects/ Others	61	2.71	281	12.49	1011	44.95	896	39.84	2249	100	3.21	.54
Objects/ Groups	226	10.39	358	16.45	892	40.99	700	32.17	2176	100	3.59	1.4
Objects/ Community	71	3.57	392	19.73	1086	54.66	438	22.04	1987	100	2.94	.59
Recipients/ Self	45	2.04	160	7.24	1078	48.76	928	41.97	2211	100	3.30	.50
Recipients/ Others	166	8.75	409	21.51	859	45.19	467	24.57	1901	100	2.84	.61
Recipients/ Groups	138	6.42	365	16.98	1026	47.74	620	28.85	2149	100	2.98	.48
Recipients/ Community	70	3.63	372	19.28	1006	52.15	481	24.95	1929	100	2.99	.60
Resources/ Self	34	1.52	139	6.22	1214	54.32	848	37.94	2235	100	3.28	.49
Resources/ Others	70	3.42	269	13.14	1104	53.93	604	29.51	2047	100	3.08	.55
Resources/ Groups	36	1.70	151	7.13	1174	55.40	758	35.77	2119	100	3.23	.51
Resources/ Community	83	3.99	298	14.31	1015	48.75	686	32.95	2082	100	3.11	.53
Partners/ Self	24	1.09	118	5.35	1197	54.26	867	39.30	2206	100	3.30	.46
Partners/ Others	47	2.08	170	7.51	1168	51.59	879	38.83	2264	100	3.26	.52
Partners/ Groups	49	2.31	176	8.28	1223	57.55	677	31.86	2125	100	3.17	.52
Partners/ Community	70	3.50	212	10.61	1098	54.93	619	30.97	1999	100	3.12	.57

1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Conclusions//Implications

Respondents tend to be white males, high school freshmen with one year in FFA. In addition, few hold a chapter office (less than 20% are officers at the local level), and members do not view themselves as a leader in the chapter.

In the context of leadership activities for chapters participating in civic engagement, as FFA members moved through the continuum (activities focusing on self development, interpersonal skills, groups, and community) agreement decreased in each area. This is consistent with the National FFA study with a general population of rural FFA members (Peiter Horstmeier & Nall, 2005).

Participants in FFA chapters recognize the focus on their own personal development in leadership activities. However results from this study imply these youth have not been given the opportunity for community and group development. Because of the respondents' educational level and years of experience in FFA, researchers can not conclude chapters are not developing the higher level of leadership skills in context of groups and community.

FFA members who participate in civic engagement activities indicate they experience positive member roles in youth-adult interactions. In examining the role of youth in youth-adult interactions, FFA members view themselves as partners to a greater degree than any of the other roles. As they move through the youth-adult interaction continuum, (view youth's role as objects, resources, recipients, and partners by adults) their agreement increases. This is also consistent with findings of Peiter Horstmeier and Nall (2005).

In examining the role-context matrix, FFA members who participated in civic engagement activities identified objects and groups as the strongest relationship. Rural FFA members indicate they are treated as objects by adults in group leadership activities.

Recommendations

It is recommended chapter leadership development activities that examine member role and context of activities continue. FFA chapters should continue to design activities that engage youth as objects, recipients, resources, and partners in an age-appropriate manner. Programming emphasis should be given to assist rural youth gain skills that help them better understand community. Programming may include civic engagement, service learning, etc.

Recently, leaders with the National FFA Organizations have focused youth leadership development programming on civic engagement. Programming should continue to focus on civic engagement; however strategies must be implemented to improve the relationships between youth and adults. It is recommended that for civic engagement projects to be successful for youth leadership development, the youth-adult relationship should be one of partnership.

Professional development focusing on planning and implementation of a community civic engagement project should be conducted. Agricultural educators should be educated on the leadership development aspects and leadership outcomes of member participation in civic engagement activities. In addition, state leaders should encourage more chapter participation in civic engagement resulting in greater youth leadership development outcomes.

Further analysis of data from this study should compare rural FFA member's gender, grade level, years of FFA membership, chapter leadership experiences, and leadership

experiences in other youth organizations. Differences and similarities among specific demographic areas for member role, context of activities, and relationships within the role-context matrix should be analyzed.

This study should be replicated to evaluate FFA member perceptions of youth-adult interactions and context of leadership activities over time. In addition, it is recommended to conduct focus group interviews with chapter FFA leaders to further define and clarify the degree of involvement in member roles and the context of the leadership activities.

Further research should be conducted to examine the FFA advisors' role in developing members' leadership skills. Advisors often are the adults youth interact with in the member role. If change is to take place and move member role towards enhanced partnership in the role-context matrix, advisors' viewpoints need to be evaluated.

Discussions/Implications

Agricultural Education has prided itself on developing youth leadership through secondary agriculture programs and the FFA organization since the 20th century. Research studies have shown that participation in FFA enhances leadership abilities. Further studies in leadership education discuss how civic engagement activities contribute to youth leadership development.

The benefits of engaging young people as partners in addressing real community issues and concerns are increasingly well documented. When young people exercise leadership in real community contexts, their activities have more meaning and young people feel a stronger bond to the community in which they live. Furthermore, when leadership development activities have real consequences, they are not seen as just practice for future community roles. Community-based leadership experiences include civic engagement service learning, action research, youth organizing and youth serving on community boards.

Peiter Horstmeier (2006) recommended that FFA chapters should design activities to engage youth as objects, recipients, resources, and partners in an age-appropriate manner. Similarly leadership development activities should help young people gain skills in the context that help them better understand self, interact with others, function effectively in groups, and provide leadership within the community. Civic engagement activities are such activities.

This study analyzed the context of leadership activities and member role for chapters involved in Civic Engagement leadership activities. However, results from this study describes that the strongest relationship in member role and the context of leadership activities was in Objects and Groups. Therefore, rural FFA members participating in civic engagement leadership activities indicate that their leadership activities were chapter and adult driven. This indicates professional development with FFA advisors on youth-led partnership must occur. If civic engagement leadership activities are to be effective, we as adult leaders must provide the students to be engaged and learn leadership themselves.

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EXPLORING GOAL-SETTING AS A TOOL FOR LEADERSHIP DEVELOPMENT

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Abstract

Goal-setting theory is based on the premise that conscious goals affect action and is supported by four decades of research and more than 1,000 scholarly publications. Although the theory has been widely applied in management settings, it is an underused framework in the broader field of leadership development. This study considers the effects of goal-setting as applied in a leadership program conducted for local board members in a nonprofit membership organization, the Florida Farm Bureau Federation. A final reduced regression model explains about 25 percent of the variance in individual performance by considering goal specificity, goal difficulty, education level, and gender. This study has implications for professional development programming and its application of goal-setting theory. Additional research is needed to explore further the application of goal-setting theory in programming for volunteer leaders.

Introduction

Books and scholarly articles on leadership development include a wide range of theories and practices. Of these approaches, theories of motivation seem to be at the core. Furthermore, goal-setting is recognized, either implicitly or explicitly, among virtually all psychological approaches to motivation (Austin & Vancouver, 1996; Latham, 2007; Locke & Latham, 1984; Mitchell & Daniels, 2003). *Goal-setting theory* has developed into one of the most practical and empirically sound theories of motivation (Latham, 2007; Locke & Latham, 2002; Miner, 1984; Pinder, 1998). Unfortunately, past research on goal-setting theory has focused primarily on motivation in work settings (Locke & Latham, 2002) and ignored the motivation associated with effective leadership in community and volunteer settings. Research is needed to determine the appropriateness of goal-setting for developing effective leadership in these contexts.

Theoretical/Conceptual Framework

Goal-setting theory "is based on Ryan's (1970) premise that conscious goals affect action" (Locke & Latham, 1990, 2002, p. 705). According to the theory, goals affect action in the forms of choice, intensity, and persistence (Latham, 2007, p. 176). In addition, goals motivate individuals to develop relevant strategies for goal attainment (Locke, 2001). When subjects experience success in goal-setting, there is increased commitment to future goals, which further improves performance. This "high performance cycle" (Figure 1) begins with the goal core, or goal content, measured in terms of specificity and difficulty. Goal intensity is further determined by moderators, particularly goal commitment and goal importance. These aspects of goal-setting have been widely applied and researched in for-profit organizations, yet goal setting theory has received little consideration in the context of nonprofit organizations and volunteer-run groups.

Although Herman and Renz (2002) offer a number of theses on nonprofit organizational effectiveness, more research is needed to understand more clearly the techniques for effectively developing volunteer leaders for nonprofit organizations and associations. This is particularly

important, since "the more general tendency of nonprofit scholars is to ignore membership organizations and associations, especially grass-roots associations" (Smith & Shen, 1996, p. 285). These voluntary associations are an important resource for recruiting and developing local leaders (Bolton, 1991), yet there is no consensus on the best approach for maximizing that leadership-development process.

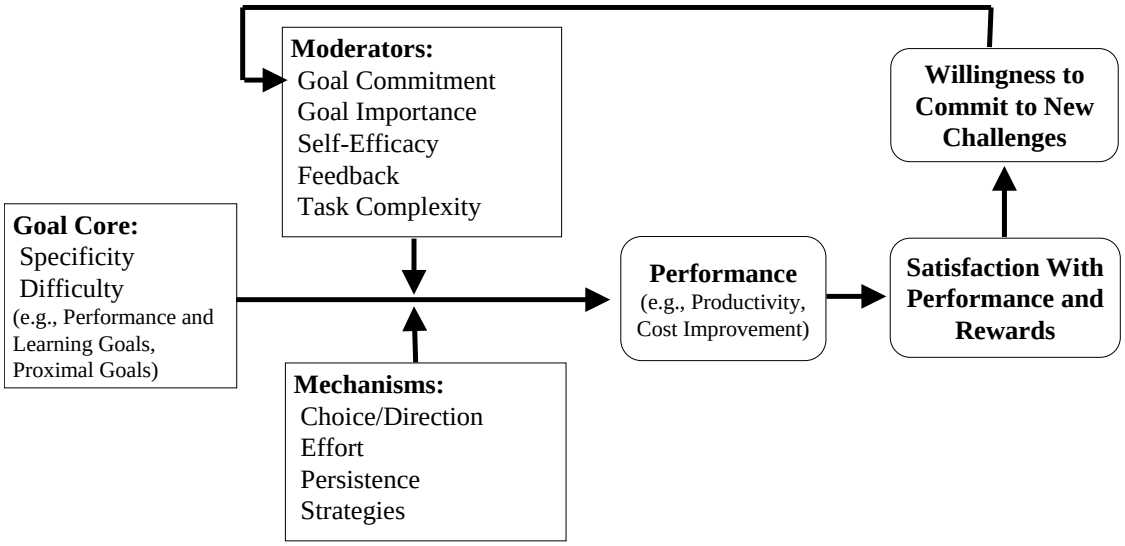

Figure 1. Essential elements of goal-setting theory and the high-performance cycle. Note. From "Building a Practically Useful Theory of Goal Setting and Task Motivation: A 35-Year Odyssey," by E. A. Locke and G. P. Latham, 2002, *American Psychologist, 57*(9), p. 714. Copyright 2002 by the American Psychological Association, Inc. Reprinted with permission.

The Florida Farm Bureau Federation (FFBF) is one of many membership associations seeking to develop the effectiveness of its volunteer leaders. FFBF has identified the leadership role of local officers in county Farm Bureau groups as pivotal to organizational success (Carter, 2004). Needs assessments conducted in 2003 and 2004 revealed that FFBF local leaders need and are willing to engage in professional development programming to strengthen their grassroots efforts (Carter, 2004; Kaufman & Rudd, 2006).

In a conscious effort to improve the leadership capacity of its local board members, FFBF committed to develop the "Strengthening the Voice" (STV) program. Beyond formal workshops, the STV program emphasized the importance of application and follow-up. The general approach of the program was to (1) conduct a workshop, (2) have participants set goals for adopting specific best practices, and (3) provide follow-up reminders to participants regarding their best-practice goals and other important points from the program.

FFBF staff implemented the first STV program component, *Farm Bureau Foundations*, involving 138 local FFBF board members from 45 different Florida counties. Although the initial feedback from STV program participants was positive, more information was needed to gauge and understand the impact of the program in the months following the program. The

practitioners needed to know if the goal-setting process was helpful in improving board performance, and if so, how.

Purpose and Objectives

The purpose of the study was to explain local board performance, as related to goal-setting conducted through a professional development program for local boards of a nonprofit organization. The objectives of this study were as follows:

1. Measure the goal attributes experienced by program participants with their *Farm Bureau Foundations Best Practices* goals; and
2. Explain individual-level performance with best practices identified in the *Farm Bureau Foundations* program.

Procedures

This exploratory study used a causal-comparative design. The dependent variable for the study was *Farm Bureau Foundations Best Practices* performance, as self-reported by program participants in their responses to a mailed questionnaire. The independent variable data were collected in the same mailed questionnaire. Goal-setting theory constructs were of particular importance in this study; individual demographics and behaviors were also considered.

At the time of this study, no standardized instruments existed to test goal-setting theory in a universal setting (personal communication, Edwin Locke, May 4, 2006). As a result, the researchers developed the "Best Practices Goal Survey" to assess the best practices adoption and goal achievement by *Farm Bureau Foundations* program participants.

To minimize measurement error of the instrument, a panel of experts reviewed the "Best Practices Goal Survey." The panel included university faculty members, for their experience in survey research, and Farm Bureau staff members, for their knowledge of the target population. After incorporation of feedback from the panel, the researchers pilot-tested the survey instrument using cognitive interviews with five FFBF state board members.

The survey efforts for this study yielded a unit response rate of 61.6 percent (n=85) from the population of identified program participants (N=138). To evaluate non-response bias, the researchers compared demographics and select variables of early responders to late responders (Ary, Jacobs, & Razavieh, 2002; Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). Tests for ANOVA revealed no significant differences between early and late responders.

This study's dependent variable, *Farm Bureau Foundations Best Practices* performance, was calculated as an index. Study participants were asked to indicate to what extent they implemented 17 specific practices during the preceding six months. Response options included: "not at all," "somewhat," "mostly," and "completely." These responses were coded "0", "1", "2", and "3", respectively. The researchers evaluated the final index for reliability and found a Cronbach's alpha (α) of 0.89.

The independent variable data for this study were collected through demographic and goal-related questions in the "Best Practices Goal Survey." The goal-related items were then grouped into constructs using principle components analysis. When considered as a group, the Cronbach's alpha reliability estimate of all goal-related questions was .877. For individual constructs, goal specificity had a reliability of .738, goal difficulty had a reliability of .763, goal commitment had a reliability of .838, goal-related self-efficacy had a reliability of .708.

The goal constructs measured in this study were arranged in a hypothesized path model. The hypotheses were derived from goal-setting theory and more general perceptions of the goal-setting process. They include:

1. Individuals with higher perceived levels of goal specificity will have higher levels of performance.
2. Individuals with higher perceived levels of goal difficulty will have higher levels of performance.
3. Individuals with higher perceived levels of goal specificity will have higher levels of goal-related self-efficacy.
4. Individuals with higher perceived levels of goal specificity will have higher levels of goal commitment.
5. Individuals with higher perceived levels of goal difficulty will have lower levels of goal-related self-efficacy.
6. Individuals with higher perceived levels of goal-related self-efficacy will have higher levels of goal commitment.
7. Individuals with higher perceived levels of goal commitment will have higher levels of performance.

The researchers analyzed these relationships through correlation analysis and multiple regression analysis. Correlations between variables were analyzed to examine individual relationships, whereas multiple regression analysis offered the opportunity to consider the joint effects of independent variables on best-practices goal achievement. An alpha level of .05 was set *a priori* for the statistical analysis.

Block regression models were identified prior to analysis because the block models offered the opportunity to focus the investigation on specific components offered by goal-setting theory and then build in additional explanatory parameters. Goal-setting theory proposes that goal content, measured in the form of goal specificity and goal difficulty, is the most important consideration in explaining performance. As such, goal content provided the foundation for the block models. Goal intensity, measured by goal commitment and goal-related self-efficacy, provided the next tier of analysis.

Although goal-setting theory does not highlight demographic differences as important contributors, a review of the related literature suggests that such differences might warrant further investigation (Cullen et al., 2004; Doest, Maes, Gebhardt, & Koelewijn, 2006). Accordingly, the researchers added individual demographics and behaviors in the third regression model and then considered them alone in model four.

The researchers identified a fifth reduced regression model by including parameters with a *p*-value less than .10 in any of the four preceding regression models. This reduced model was more parsimonious than the original four models and is therefore an important finding of this exploratory study.

Findings

The dependent variable, the best-practices performance index, had a mean rating of 2.07 that suggests that respondents believed that they were "mostly" engaged in the 17 local Farm Bureau practices that comprise the index. Index ratings ranged from 0.26 to 2.94, suggesting that some respondents generally believed they were "not at all" engaged in the practices, while other respondents reported that they were "completely" engaged in the practices.

The data from the goal-related questions were organized and indexed into constructs proposed by goal-setting theory. Among the goal-related questions, self-efficacy statements were those to which respondents agreed most. The goal-related statements with the highest level of disagreement were related to difficulty (Table 1).

The most important components of goal-setting theory are goal specificity and difficulty. As shown in the descriptive statistics in Table 2, program participants agreed to some degree that the goals they set were specific (M = 0.33, SD = 0.57). They tended to disagree that the goals they set were difficult (M = -0.26, SD = 0.57). With regard to goal intensity, program participants agreed to some degree that they were committed to the goals that they set (M = 0.38, SD = 0.56). To an even stronger degree, they felt capable of accomplishing the goal-related tasks, as demonstrated by their self-efficacy ratings (M = 0.65, SD = 0.53).

Analysis of the goal-related constructs revealed a number of weak-to-moderate relationships with personal performance on the local Farm Bureau practices (Table 2). Consistent with hypothesis 1, data revealed a positive relationship between performance and specificity (r = .278), suggesting that individuals who believed their goals to be more specific were also likely to report higher levels of performance. The relationship between personal performance and goal difficulty was negative but not significant. With respect to goal intensity, commitment and self-efficacy both displayed positive relationships with personal performance (r = .261 and r = .285, respectively).

Among the goal-related hypotheses, five were supported, but the two related to goal difficulty were not supported (Figure 2). The supported hypotheses include:

1. Individuals with higher perceived levels of goal specificity have higher levels of performance.
3. Individuals with higher perceived levels of goal specificity have higher levels of goal-related self-efficacy.
4. Individuals with higher perceived levels of goal specificity have higher levels of goal commitment.
6. Individuals with higher perceived levels of goal-related self-efficacy have higher levels of goal commitment.

7. Individuals with higher perceived levels of goal commitment have higher levels of performance.

Table 1
Farm Bureau Foundations' participants' ratings on questions related to the goal-setting process

Construct Component	*n*	Mean	SD
Goal Specificity			
◊ I have been clear about the details of the STV goal that I set following the *Farm Bureau Foundations* workshop.	80	0.56	0.76
◊ My STV goal focused on a specific activity or outcome.	80	0.63	0.74
◊ I have shared my STV goal with others.	80	0.33	0.82
Goal Difficulty			
◊ On the day of the workshop, I perceived my STV goal as being difficult.	81	-0.14	0.79
◊ In the months following the workshop, I perceived my STV goal as being difficult.	81	-0.26	0.75
◊ Others likely perceive the STV goal I set as being difficult.	80	-0.20	0.74
◊ In general, the *Farm Bureau Foundations* best practices proposed in the workshop are difficult to implement.	80	-0.56	0.82
◊ It has been difficult for me to develop a strategy for personally implementing the best practices.	79	-0.14	0.92
Goal Commitment			
◊ I have been committed to the STV goal that I set.	81	0.44	0.77
◊ It is important for me to accomplish the STV goal that I set.	81	0.65	0.69
◊ Since the workshop, I have increased my attention to *Farm Bureau Foundations* best practices.	80	0.49	0.78
◊ Compared to those who did not attend the workshop, my attention has been more focused on the *Farm Bureau Foundations* best practices.	79	0.48	0.70
◊ I have invested a high level of effort in adopting the *Farm Bureau Foundations* best practices.	79	0.13	0.81
◊ Overall, I have been highly persistence in working toward my STV goal.	79	0.14	0.83
Self-Efficacy			
◊ During the months following the workshop, I was confident in my ability to adopt the *Farm Bureau Foundations* best practices.	81	0.57	0.74
◊ After the *Farm Bureau Foundations* workshop, I was prepared to apply knowledge and strategies related to the best practices.	79	0.70	0.68
◊ As a result of this program, I am a more effective Farm Bureau member and leader.	79	0.72	0.68

Note1: SD = standard deviation.
Note2: Responses options were coded as follows: Strongly Disagree (-2), Disagree (-1), Neither Agree nor Disagree (0), Agree (1), or Strongly Agree (2).

Table 2

Correlations between local Farm Bureau best practices performance and independent variables (n=81)

			Pearson Correlation Coefficients									
Variable	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Best practices performance	2.07	0.50										
2. Goal Specificity	0.33	0.57	**.278**									
3. Goal Difficulty	-0.26	0.57	-.200	-.033								
4. Goal Commitment	0.38	0.56	**.261**	**.632**	-.059							
5. Goal-related Self-efficacy	0.65	0.53	**.285**	**.679**	-.116	**.733**						
6. Engagement in practices relative to other 6 month periods	3.31	0.77	.059	**.332**	-.003	**.326**	**.379**					
7. Meetings attended during 6 months	4.78	2.34	.170	.199	.145	.164	**.227**	.119				
8. Years on local FFBF board	11.72	11.23	.182	-.039	-.009	.086	.047	-.203	.081			
9. Age	54.99	15.01	.203	-.007	-.033	.072	.084	**-.226**	**.227**	**.488**		
10. Education level	4.09	1.46	-.187	.078	**-.233**	-.079	-.009	-.032	-.224	.025	.026	
11. Gender (1=female)	0.20	0.40	**-.312**	-.014	-.083	.002	.061	.079	-.214	-.095	-.117	.087

Note 1: Goal construct ratings are based on questions that used a five-point Likert-type scale: “Strongly Disagree” (-2), “Disagree” (-1), “Neither Agree nor Disagree” (0), “Agree” (1), and “Strongly Agree” (2).

Note 2: Education level was coded in the following categories: “ Some High School or Less” (1), “High School Dimploma or GED” (2), “Some College, No Degree” (3), “Associate Degree” (4), “Bachelor’s Degree” (5), “Master’s Degree” (6), “Professional or Doctorate Degree” (7).

Note 3: Coefficients in bold are significant at the .05 alpha level

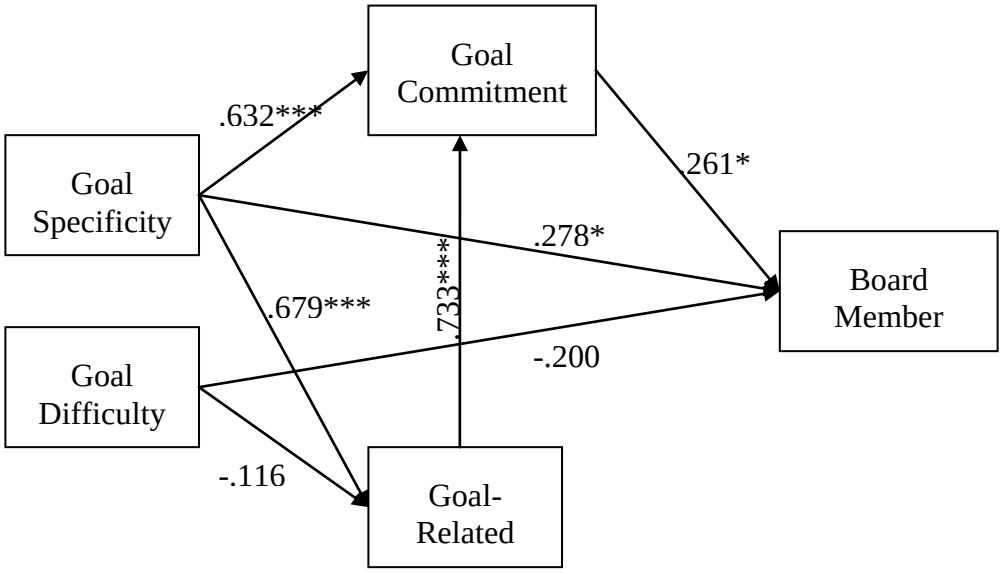

Figure 2. Correlations between goal constructs and personal performance graphically displayed in the hypothesized model. Note 1: Although arrows suggest causal paths, the statistics reported are only correlations. Note 2: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Among individual-level parameters, the researchers found a moderate negative relationship (r =-.312) between ratings of personal performance and gender (Table 2). This suggests that female board members were likely to report lower levels of performance. Other demographic parameters were not significantly correlated with performance.

All five of the block regression models investigated were significant at the .05 *alpha* level. Conventional coefficients for the models are displayed in Table 3, offering the opportunity to consider changes in parameter influence across models. Key findings from the regression models are as follows:

- The goal core (specificity and difficulty) offers a moderate correlation to performance, explaining about 10 percent of the variance.
- Goal specificity had a significant, positive relationship with reported performance when goal difficulty alone was controlled, but the relationship was not significant when other explanatory variables were added to the model.
- The goal intensity constructs (commitment and self-efficacy) offer little or no explanatory value beyond the goal core (specificity and difficulty).
- The goal difficulty construct maintained a negative relationship with performance but was significant only after individual demographics and behaviors were included in the model.
- Among the demographic and behavioral parameters, gender displayed a significant, negative relationship with performance.
- The performance measure is better explained by both goal-related constructs and individual demographics than by either set of parameters alone.
- A reduced model that includes goal specificity, goal difficulty, education level, and gender explained about 25 percent of the variance in performance.

Table 3

Conventional regression models for board member performance: Explaining ratings of personal performance among best practices using variables associated with goal core, goal intensity, and demographics

Source	Model 1 n=80		Model 2 n=80		Model 3 n=72		Model 4 n=72		Model 5 N=79	
	Est.	α	Est.	α	Est.	α	Est.	α	Est.	α
Intercept	1.95	<.001	1.89	<.001	1.91	<.001	1.64	<.001	2.35	<.001
Goal Content										
◊ Specificity	0.24	.013	0.14	.308	0.19	.204			0.26	.006
◊ Difficulty	-0.17	.079	-0.16	.106	-0.22	.050			-0.24	.009
Goal Intensity										
◊ Commitment			0.08	.607	-0.03	.863				
◊ Self-Efficacy			0.10	.550	0.17	.341				
Individual-Level										
◊ Engagement in practices relative to other six-month periods					0.02	.799	0.10	.214		
◊ Number of meetings attended during 6 months					-0.01	.738	0.00	.991		
◊ Number of years on local FFBF board					0.01	.377	0.00	.564		
◊ Age					0.00	.339	0.01	.183		
◊ Education level					-0.08	.059	-0.05	.230	-0.09	.018
◊ Gender					-0.39	.006	-0.38	.013	-0.39	.003
R-Square	.114		.129		.325		.178		.274	
Adjusted R-Square	.091		.083		.214		.102		.234	
F-Statistic	4.95	.009	2.78	.033	2.93	.005	2.34	.041	6.97	<.001

Conclusions

Since this was a census study of FFBF local board members, readers should carefully consider the generalizability of the conclusions of the study beyond the population described. With this limitation in mind, the following conclusions were derived from the findings.

1. **Perceived differences in the goal-setting process help to explain perceived levels of performance, beyond demographic differences.**

This study provides evidence of the practical value of goal-setting theory in explaining personal performance among local FFBF board members. Goal-setting theory suggests that goal specificity and goal difficulty should be the most significant contributors to personal performance (Locke & Latham, 1990). Although goal difficulty and goal specificity were not consistently significant in explaining performance across regression models, their observed effect sizes often exceeded the observed effect sizes of the individual demographic variables analyzed. In addition, goal commitment and self-efficacy were significantly correlated with performance and displayed moderate effect sizes. The principles of goal-setting theory should be further applied in professional development efforts with local Farm Bureau board members. In addition, options should be explored for incorporating the principles of goal-setting theory in similar contexts.

2. **The best-practices goals set by participants in the *Farm Bureau Foundations* program component were specific, yet lacking in difficulty.**

According to goal-setting theory, specific, difficult goals improve performance (Locke & Latham, 1990, 2002). In fact, a key aspect of goal-setting theory is the belief that a positive, linear relationship exists between goal difficulty and end performance. Since participants in the *Farm Bureau Foundations* program component did not perceive their best-practices goals as difficult, some potential effects of the goal-setting were lost. Future goal-setting efforts should emphasize the value and importance of challenging goals. When appropriate, goals should be assigned in a manner that ensures a minimum degree of difficulty and a more objective analysis of difficulty level. As for the observed influence of goal specificity, more research is needed to determine how specificity increases performance without the complementary aspect of difficulty.

3. **The goal intensity experienced by program participants was low, but, as a whole, the group tended to be more committed than not and generally felt prepared to implement recommended practices.**

Although goal intensity could have improved through increased goal commitment, the program participants as a whole felt somewhat committed to their goals. This commitment may have been fueled by their self-efficacy with the tasks. However, more can be done to maximize the goal intensity experienced or expressed by program participants. According to Locke and Latham (1990; 1994), goal intensity can be influenced through role modeling, persuasive communication, and the exertion of reasonable pressure for performance. Some role modeling and persuasive communication was built into program activities for the *Strengthening the Voice* program; yet, more can be done to provide sufficient "treatment." Program presenters may

require further training on the potential effects of goal intensity and how they can directly influence goal intensity, particularly through influences on goal commitment.

4. **Gender is an important consideration for understanding and explaining personal performance.**

The relationship between gender and performance was unexpected. Gender has been considered in previous studies of goal-setting, but effects from gender are rare. Cullen and colleagues (2004) found male students were having more success with general goal-setting than female students. However, these researchers recognized the uniqueness of their findings and suggested that further research be conducted before drawing conclusions. The situation with FFBF's *Strengthening the Voice* program also warrants further investigation. Since these differences are based on self-reported ratings, they cannot be assumed to be "true" program effects. Women who participate in the program may be performing at higher levels than men, yet are rating themselves more harshly against a self-identified standard (Eagly & Carli, 2003; Rudd, 2000). In addition, the culture of the organization may be keeping some women from performing at their full potential due to role expectations (Eagly & Karau, 2002).

Recommendations

Based upon the findings and conclusions of this study, the researchers offer the following suggestions for additional research:

1. Continue to investigate the effects of applying the principles of goal-setting theory. Investigation should continue with FFBF local boards and other volunteer-based groups. When possible, the implementation of goal-setting principles should be more rigorous, with particular emphasis on increasing levels of goal difficulty. In addition, path analysis through the structural equation model should be applied to clarify further the pathways that goal constructs follow in their influence on performance.
2. Explore options for measures of goal constructs that offer improved reliability and validity. Thousands of studies have been conducted involving goal-setting theory, and the observed reliability of goal constructs has exceeded the general social science expectation of .80 and above. The measures applied in those studies should be synthesized into a universal instrument that can be adapted for specific contexts.

Discussion/Implications

The findings from this study have implications for goal-setting theory and provide questions to guide additional research on the theory. Much of the previous research involving goal-setting theory focused on its application in business settings. This study provides some initial support for the use of goal-setting in nonprofit organizations and volunteer professional development. However, the way goal-setting works in these contexts may be different; the role of goal difficulty may be less important than goal specificity and goal intensity. More research should be done to investigate differential effects. A first step in that process is to improve measures of the goal constructs. Measurement error was a concern in this study and is likely to be a concern in future studies. To the degree that it is possible,

universal measures should be created that meet generally accepted standards for validity and reliability. Once valid, reliable instruments are available, additional research can be conducted to investigate causal paths and interactive effects in greater detail. Beyond the goal constructs, more empirical evidence is needed to understand the influence and interactive effects of demographic variables, especially gender and education level. These interactive effects offer potential implications for future application of the theory.

As leadership educators work to increase the development that occurs with their courses and programs, they should consider the potential influence of goal setting. Many classes and programs begin by stating the learning objectives. Leadership educators should consider ways to reframe these learning objectives into personal or group goals. The process may be as simple as asking the learners what their goals are for the course or program. Once goals are identified and set at an appropriate level, the leadership educator should work to engender goal commitment among the learners. Different approaches may work in different settings. In the STV program, the participants signed a goal commitment form. Leadership educators may consider a "learning contract" as an appropriate equivalent. Perhaps the best approaches are yet to be discovered. The key is to be intentional, build upon the theoretical foundations of goal setting, and share your findings with other practitioners.

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PROFESSIONAL DEVELOPMENT FOR LOCAL VOLUNTEER LEADERS: A CONCEPTUAL PLAN

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Abstract

Although some people debate whether leaders are born or made, most experts agree that leadership skills can be enhanced through professional development activities. The Andragogy in Practice Model provides a helpful starting point for leadership program planning, but it is sometimes helpful to consider the example set by others. This paper outlines a seven step approach that was successfully applied when planning and implementing a professional development program for volunteer leaders. The steps are based upon the Andragogy in Practice Model and outline the process from the point of needs assessment through program evaluation.

Introduction

The nature of servant leadership is for the leader to put the needs of others before her/himself (Greenleaf, 1970; Sendjaya & Sarros, 2002). However, one key to improved servant leadership is through "capacity building" of potential leaders (Hustedde & Woodward, 1996). This capacity building can take the shape of a professional development program, but it must be designed and implemented in a way that further motivates individuals to become servant leaders while targeting specific needs of the sponsoring organization or community (Goff & Williams, 2004; Schauber & Kirk, 2001). Servant leaders often serve in a volunteer role, which makes the need for program acceptance all the more critical (Fisher & Cole, 1993). Volunteer leaders need to be able to connect program activities to a felt need, and they need to feel engaged in the learning process. Otherwise, these leaders may withdraw their support and no longer volunteer their time (Bradner, 1999; O'Connell, 1976; Pearce, 1993). For this reason, careful attention to adult learning principles is all-the-more critical when developing programming for servant leaders (VanWinkle, Busler, Bowman, & Manoogian, 2002).

The 2007-2010 National Research Agenda for Agricultural Education and Communication identifies several research priority areas associated with leadership development. Among those is a research priority to "develop and disseminate effective leadership education programs" (Osborne, 2007, p. 6). Accordingly, it is important to share examples of successful leadership programs. The purpose of this study was to examine the framework that guided a leadership development program for volunteer agricultural leaders. The following discussion proposes a conceptual model for developing volunteer leadership programming that incorporates adult learning theory and the contextual needs of a grassroots organization.

The Andragogy in Practice Model

The Andragogy in Practice Model provides a helpful starting point for any educational programming involving adults. The model was developed in 1998 "as an enhanced conceptual framework to more systematically apply andragogy across multiple domains of adult learning

practice" (Knowles, Holton, & Swanson, 2005, p. 148). There are three dimensions to the andragogy in practice model: (1) goals and purposes for learning, (2) individual and situation differences, and (3) andragogy: core adult learning principles (Figure 1).

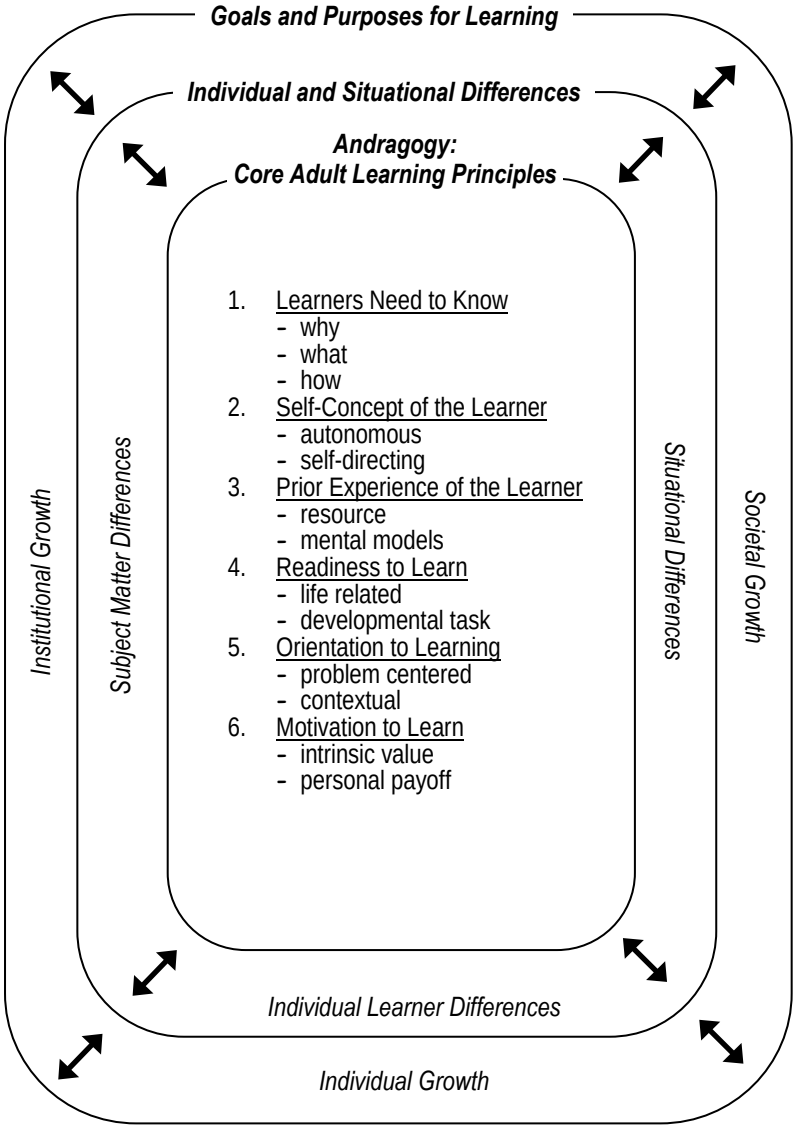


Figure 1. Andragogy in Practice Model. Note. From "The Adult Learner," by M. S. Knowles, E. F. Holton, and R. A. Swanson, 2005, p. 149. Copyright 2005 by Elsevier. Reprinted with permission.

As part of the model, goals for adult learning are conceptualized as an outside ring and are identified as goals for individual, institutional, or societal growth. Learning goals are an important foundation to any professional development program and should be considered throughout. The next dimension of the model is displayed as a middle ring, highlighting subject-matter differences, situational differences, and individual learner differences. These differences represent the many contextual factors that must be considered in program planning. The core of

the model focuses on six andragogical principles: (1) learners need to know, (2) self-concept of the learner, (3) prior experience of the learner, (4) readiness to learn, (5) orientation to learning, (6) motivation to learn (Knowles et al., 2005). These andragogical principles ensure a learner-centered approach to education, based on important concepts from adult psychology and sociology. For a detailed discussion of the principles, see *The Adult Learner*, by Knowles, Holton, and Swanson (2005).

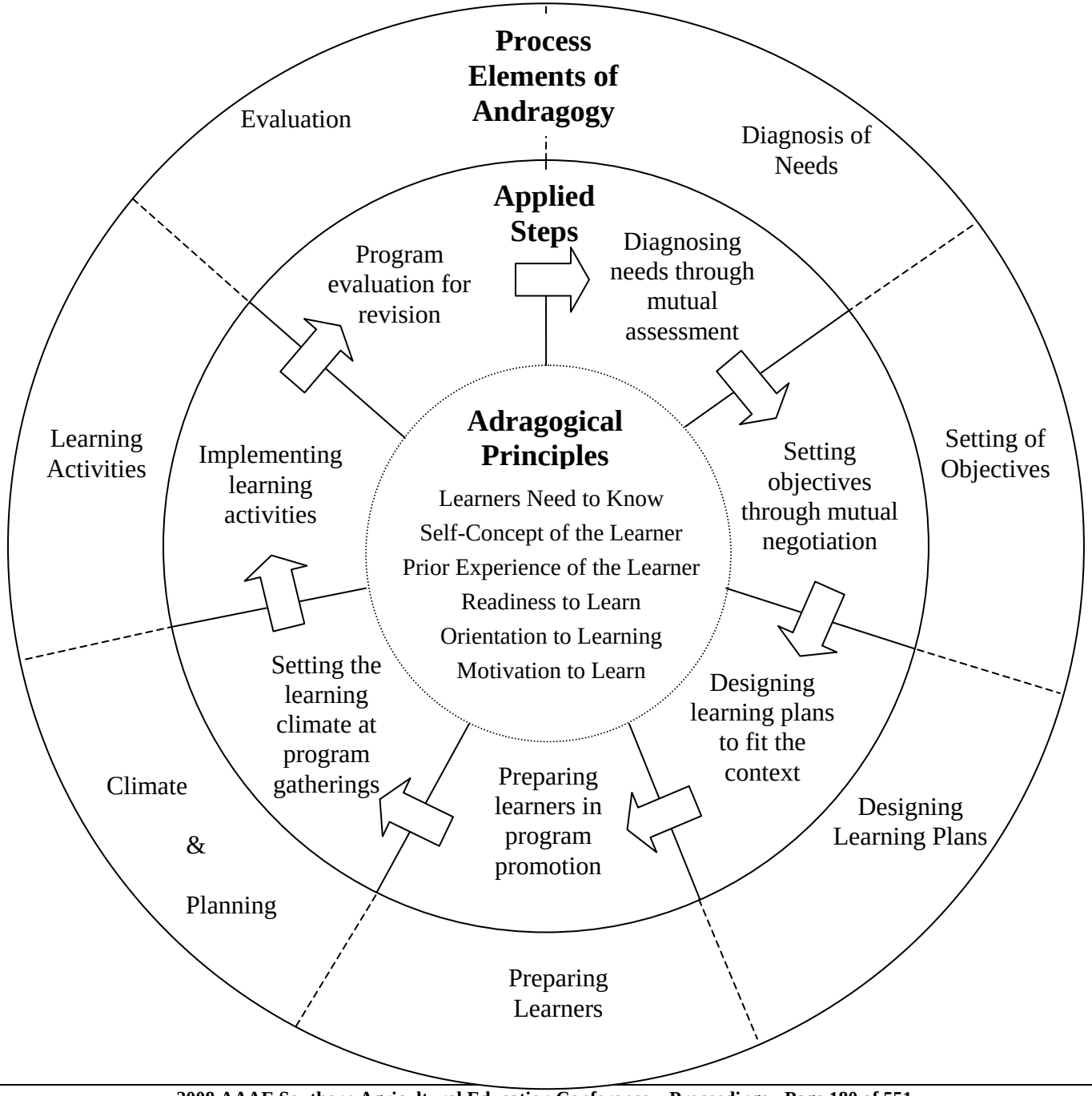
The Andragogy in Practice Model has the benefit of application to a vast number of adult learning situations. Practitioners can begin with learning goals for the situation and follow the model inward, or they can begin with the andragogical principles and move outward to the specific learning goals. According to Knowles and colleagues (2005), the process of andragogy involves eight elements: preparing the learner, establishing a climate conducive to learning, creating a mechanism for mutual planning, diagnosing the needs for learning, formulating program objectives (which is content) that will satisfy these needs, designing a pattern of learning experiences, conducting these learning experiences with suitable techniques and materials, and evaluating the learning outcomes and rediagnosing learning needs.

An Adapted Process Model

The Andragogy in Practice Model provides a helpful starting point for adult program planning. Even still, practitioners may find it helpful to reorganize some of the concepts into a process that provides a clearer road map to follow. A successful approach to professional development programming with volunteer leaders might include these seven steps:

1) Diagnosing needs through mutual assessment,
2) Setting objectives through mutual negotiation,
3) Designing learning plans to fit the context,
4) Preparing learners in program promotion,
5) Setting the learning climate at program gatherings,
6) Implementing learning activities, and
7) Program evaluation and revision.

This seven step process incorporates the elements and concepts from the Andragogy in Practice Model (Figure 2). The process steps were implemented with a large grassroots organization, and both the organization and the program participants expressed a high degree of satisfaction. A discussion of the program planning process with that organization follows.


Process Elements of Andragogy
Evaluation
Diagnosis of Needs
Applied Steps
Program evaluation for revision
Diagnosing needs through mutual assessment
Adragogical Principles
Learners Need to Know
Self-Concept of the Learner
Prior Experience of the Learner
Readiness to Learn
Orientation to Learning
Motivation to Learn
Learning Activities
Implementing learning activities
Setting objectives through mutual negotiation
Setting of Objectives
Setting the learning climate at program gatherings
Designing learning plans to fit the context
Climate & Planning
Preparing learners in program promotion
Designing Learning Plans
Preparing Learners

The Process Model in Practice

Farm Bureau is a nonprofit organization that employs paid staff members but prides itself in maintaining a grassroots focus. To that end, Farm Bureau maintains a culture of servant leadership as Farm Bureau members volunteer to serve on committees and boards at the multiple levels. At least one state Farm Bureau has identified the volunteer leadership of local Farm Bureau board members as pivotal to organizational success (Carter, 2004). Accordingly, they have invested in a process for further developing local leaders. The process followed can serve as a helpful example to other groups that wish to engage in capacity building with volunteer leaders.

1) Diagnosing needs through mutual assessment

The development of the Farm Bureau grassroots leadership program began in 2003, when the state Farm Bureau partnered with researchers at a land-grant university to identify leadership needs. Based on interviews with Farm Bureau state leaders, Carter (2004) identified four local organizational aspects that are important for an effective grassroots process: leadership, political process, effective boards, and knowledge of Farm Bureau. When evaluating these areas with local members, Carter (2004) applied a modified Borich (1980) needs assessment and found significant differences between members' perceived importance and proficiency in the areas of leadership, political process, and knowledge of Farm Bureau. These findings suggested that leadership training in these topic areas would be appropriate for local Farm Bureau board members. A qualitative study was then conducted to further determine and/or confirm the leadership expectations, needs, and interests of local Farm Bureau board members. Local board members throughout the state were interviewed, focusing on identification of common leadership-related challenges and perceived development needs of the local Farm Bureau board. The theme areas described by Carter (2004) were well-represented in the interviews with local board members. In addition, the findings from the interviews with local board members seemed to further support the need for and interest in professional development programming for Farm Bureau's local leaders. The research with both state leaders and local members provided a mutual assessment of learning needs that offered a solid foundation for program planning. Based on the findings, Farm Bureau chose to invest in the development of an educational program focused on Farm Bureau's local leaders (Kaufman & Rudd, 2006).

2) Setting objectives through mutual negotiation

Nonprofit scholars have cautioned against the use of a "one best way" approach to management and board practices for all organizations. Instead, "every organization must discover and continually seek to improve its practices, consistent with its values, mission, and stakeholders' expectations (Herman & Renz, 2004, p. 702). Accordingly, the program objectives identified for Farm Bureau's grassroots leadership program were based on the prior research with Farm Bureau's state and local leaders (Carter, 2004; Kaufman & Rudd, 2006) and were further refined with a project advisory committee. The Farm Bureau program, titled "Strengthening the Voice" (STV), was designed to include five topic area components: (1) effective meetings; (2) political advocacy and public relations; (3) member recruitment, development, and involvement; (4) enhancing organizational interactions; and (5) Farm Bureau foundations. Farm Bureau

contracted with a land-grant university's department of agricultural education to develop curricula for half-day workshops in each of these areas. The development process was guided by a program advisory committee that consisted of Farm Bureau staff and university representatives. The Farm Bureau staff brought extensive knowledge of the organization and experience with the local Farm Bureau board members. The university representatives were familiar with Farm Bureau, but the primary value of their involvement was their expertise in writing objectives and establishing goals for leadership programming. In this way, the outside dimension of the Andragogy in Practice Model, "goals and purposes for learning," was incorporated through mutual negotiation that maintained a focus on the needs assessments that were conducted prior to program development.

3) Designing learning plans to fit the context

The program advisory committee was essential to the program planning process because it provided a mechanism for ensuring that the program curricula was focused on the organizational context and would be applicable to the situation in which the program would be delivered. Throughout the program planning process, the curriculum writers consulted regularly with the program advisory committee and other Farm Bureau representatives to ensure that the end product would meet the needs of the organization and the intended audience. The program approach was designed to enable and ensure context-specific programming. Although the materials were written by university, they were presented to Farm Bureau in a train-the-trainer format, so that the program could be delivered locally by Farm Bureau field staff members who were knowledgeable of the individual and situational differences of the target population. Farm Bureau leaders believed this approach would be well received by program participants, because the local board members would already have a well-established relationship with the program presenters. In addition, opportunities would be available for program presenters to incorporate local examples of the concepts being presented. Although four-hour workshops were the primary events associated with the program, the program was designed to include follow-up learning opportunities. Workshop participant manuals were designed to allow program participants to take home a summary of the key points from the program. The program participant manuals could then serve as a future reference and could be shared with other local Farm Bureau leaders who were unable to attend the workshops. The workshop participants also received follow-up mailings in the months following the workshops. These mailings included professional newsletters that reviewed the key points from the program.

4) Preparing learners in program promotion

As Farm Bureau marketed the program, they highlighted aspects of the program that suggested it would be different from any passive participation that members might expect from an educational program. Program participants would be expected to actively engage in learning activities and contribute to discussion throughout the program. A promotional brochure noted that the program was an investment by the organization into the professional development of its members and local leaders. More importantly, the promotional materials pointed out that the topics and key points offered in the program were based on the felt needs of Farm Bureau members and leaders. These points were organized into best practices, making use of participants' familiarity with the concept of "best management practices" that are recommended

for improving the efficiency and effectiveness of business and land-use activities. The most effective method for preparing learners for the program may have been the informal conversations that Farm Bureau staff had in recruiting program participants. Because the Farm Bureau staff were familiar with the program, they were able to guide potential participants into knowing what to expect and to prepare them for an enhanced learning experience.

5) Setting the learning climate at program gatherings

The workshops for the program began by taking 10 to 15 minutes to develop (or reinforce) a felt need to learn and to engender confidence in the program. This was accomplished indirectly through the previously established credibility of the presenters (Farm Bureau staff members) and more directly through group discussion of the learning objectives. In addition to personal examples (which may vary from one presentation to another), consistent program examples were provided in the form of video segments in which Farm Bureau members and leaders discussed the practical value of the topics about to be addressed in the program. The program presenters shared that the program success was dependent upon participant engagement. Although the workshops offered some structured progression through pre-identified topics, presenters noted that the engagement in the learning activities and the reflection upon each activity would be essential to the learning process. Program participants were invited to ask and assist in answering any questions relevant to the program's focus.

6) Implementing learning activities

Throughout the program, learner motivation was reinforced by involving the learners in activities and discussion. One important concept emphasized through the learning activities was the "Cone of Experience," which suggests that people generally remember 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they discuss with others, 80% of what they experience personally, and 95% of what they teach someone else (Dale, 1969). Although workshop participants may have had little opportunity to "teach" concepts, the activities did provide some opportunity to "experience" the concepts being learned and certainly opportunities to "discuss" what was being learned. Presenters were urged to keep activities moving, while also being sure to take time to allow the group to process what was being learned. In addition, learning reinforcement was offered through the follow-up mailings to participants in the months following initial participation. As participants applied concepts from the program in "real-life" situations, they received informal feedback from their experience. As this occurred, Farm Bureau staff encouraged them to continue application of the concepts.

7) Program evaluation and revision

The first program component, *Farm Bureau Foundations*, was initiated in the Spring of 2006, and it was applauded by both participants and presenters. At the end of each "Farm Bureau Foundations" workshop, participants were encouraged to complete evaluation forms. The collected evaluations indicated that over 98 percent of participants were "satisfied" or "very satisfied" with the workshop. When asked to what extent they could use the ideas and skills learned in the workshop, all participants indicated that they expected to apply program concepts,

with 59 percent expecting to apply the skills and ideas "to a great extent" and 37 percent "to a moderate extent." One participant wrote, "I've been wanting/needing this info for years." Using a scale of 1-5, with 1 being poor and 5 being good, participants rated their overall mean ability across program objectives before the program as a 2.84 with a standard deviation of 0.98. Participants rated their overall mean ability after the program as a 4.39 with a standard deviation of 0.58. Significant differences between before and after ability ratings were found for all four program component objectives ($p<.001$). Additional evaluation research was conducted six months after the program was initiated. This follow-up evaluation involved a mailed survey to program participants and non-participants. It also included interviews with program presenters. Although program participants and presenters continued to express satisfaction with the program, evaluation findings did offer insights into opportunities for improving the program. These recommendations provided guidance for changes to program implementation that will further improve program efforts.

Conclusions & Implications

Like many adult learning situations, professional development for servant leaders is often a voluntary commitment. As a result, it requires input and buy-in throughout the program planning process. The Andragogy in Practice Model can be a helpful guide for ensuring the learners are engaged in the process, and the case of Farm Bureau's STV provides a practical example. The process elements are not necessarily linear, yet Farm Bureau's steps may serve as a helpful guide for others to ensure that essential principles of adult learning are not overlooked. The seven steps include:

1) Diagnosing needs through mutual assessment,
2) Setting objectives through mutual negotiation,
3) Designing learning plans to fit the context,
4) Preparing learners in program promotion,
5) Setting the learning climate at program gatherings,
6) Implementing learning activities, and
7) Program evaluation and revision.

This program planning process is effective for many reasons. The two most important characteristics are the long-term planning and the direct involvement of participants in every step of the process. The planning process was a comprehensive approach that stretched across years of research and development. During that time, the involvement of stakeholders over and over again helped to ensure that the program was on-target, and it allowed for increased willingness to commit to involvement in an intensive program.

The Farm Bureau program is still being implemented as program modules are added and offered. In addition to the direct program benefits for program participants, Farm Bureau state staff members have praised the program for the professional growth that occurred for the staff members involved in the development and delivery of the program. Staff members have improved their facilitation skills; more importantly, and the professional development model has guided their thinking on the best way to guide, influence, and develop grassroots leadership.

After early success of Farm Bureau's grassroots leadership development program, other groups have expressed interest in developing similar professional development programs for their volunteer leaders. The process outlined in this paper may provide a helpful guide for program planners. The process is based on sound principles of learning, offered by the Andragogy in Practice Model (Knowles et al., 2005). Even still, further research is needed to confirm its success with other organizations and contexts. In addition, researchers and practitioners should continually seek out ways to maximize the value of programming for volunteer leaders. Individuals and organizations designing professional development programming for volunteer leaders should apply the steps outlined in this paper and share any helpful adaptations with other practitioners.

According to Day (2000), "effective leadership development is less about which specific practices are endorsed than about consistent and intentional implementation"(p. 606). Consistent and intentional leadership development is no less important for servant leadership than it is for other leadership approaches. If we expect servant leaders to be successful, we must continue to offer the capacity building opportunities that prepare them for the challenges they will face.

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Engaging Hispanic Students in Agricultural Education and the FFA: A Three–Year Case Study

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Abstract

This paper describes the outcomes of field–based efforts to increase diversity in agricultural education high school programs and the FFA. Three schools in San Antonio, Texas were included in the case study based on three primary criteria: 1) a predominantly Hispanic student population; 2) existing FFA chapters with little Hispanic participation; and 3) teachers who were willing to explore new engagement strategies. Guided by Rogers (2003) theories of diffusion of innovations, a series of six intervention strategies were implemented: 1) provide specific FFA or agricultural education experiences for student opinion leaders; 2) provide specific experiences for parents, alumni, boosters, and school administrators (champions and opinion leaders); 3) provide professional development for the agricultural education teachers (ensure compatibility); 4) introduce new curricula and education materials to allow for an expansion of the agricultural education program (trialability); 5) provide access to an on–site project advisor (change agent); and 6) provide project leadership and oversight through a partnership among university faculty members and National FFA staff. Evidence indicated that all three schools increased Hispanic enrollment in their agricultural education program and in Hispanic membership in the FFA. Each of the three schools experienced an increase in the number of Hispanic students participating in local, state and national FFA activities over a three year period. Additionally, each school increased the total number of local, state and national FFA activities in which they participated. The three schools established FFA Alumni chapters with parents and/or boosters engaged in activities to support students.

Introduction and Theoretical Framework

Founded in 1928, the National FFA is the largest inter–curricular youth organization in public secondary schools in the United States with 490,017 members in 7,210 chapters (National FFA Organization, 2007). However the current demographics of FFA and agricultural education do not align with the 21st Century ethnic make–up in many public schools. Agricultural educators concur that the FFA makes a positive difference in the lives of students—but only for those students who enroll in agricultural education and engage in FFA activities. A great

opportunity exists to increase enrollment of students of color in agricultural education and, subsequently, FFA membership and engagement in FFA activities. The face of America is changing rapidly. In order to sustain leaderships for a viable agricultural industry, the face of agricultural education should mirror diversity from the national level to local communities and schools.

The ethnic and racial composition of the population in the United States is changing. In 2005, the U.S. population was 69% Caucasian and 14% Hispanic. The projected population for 2020 is about 61% Caucasian and 18% Hispanic (U.S. Census Bureau, 2004). The nation will continue to diversify, the Hispanic population is projected to have population growth at a rate of 39% from 2000 to 2010 and 45% from 2010 to 2030 (U.S. Census Bureau, n.d.). This national trend of an increasing Hispanic population is even greater within individual states; California, Texas and Florida are three of the four most populated states and are experiencing the most significant growth rates in Hispanic residents. A 2005 article by Petersen and Assanie supported findings of the rapidly growing Hispanic population. By 2020, Hispanics will represent the majority population in Texas. Further, trends forecast that by 2040, Hispanics will account for more than 50 percent of all Texans, while just one–third of the population will be Caucasian. The National FFA Organization (2007) reported in 2004–2005 FFA membership was 77% Caucasian and 17% Hispanic. On a national level FFA membership appears congruent with U.S. population statistics. However, on a school–by–school basis, especially in Texas, the Hispanic population is underrepresented in FFA membership and likely in agricultural education enrollment.

Nationally, only a small portion of students are engaged in agricultural education. The National Council for Agricultural Education (2000), in Reinventing Agricultural Education for the Year 2020, found that only six percent of the high school population successfully completed coursework in agriculture. This stands in contrast to the assertion made by the National Research Council (1988) that agriculture is a topic too important to be taught to only a relatively small percentage of students. Millions of students each year, from all ethnicities, are missing the numerous benefits provided through agricultural education and the FFA. The most recent long–range plan for agricultural education, “10X15,” stated that by the year 2015 there will be 10,000 quality agriculture education programs with all students being members of the FFA (National Council for Agricultural Education, 2007). In order for agricultural education to grow and enhance the quality of programs, the student body must resemble the diversity of this country, of local communities, and of individual schools.

Agricultural educators must be aware of factors that influence students of color to enroll in agricultural education classes and join the FFA; further, agricultural educators must be able to plan and carry out activities to achieve FFA membership representative of the school population. Implementing effective practices and interventions could encourage greater enrollment and participation in agricultural education and FFA.

Students of color often have negative perceptions of agricultural education, the FFA, and agricultural industry in general (Jones & Bowen, 1998; Talbert & Larke, 1995). Further, students of color may be motivated by different factors–when compared to majority students–to enroll in agricultural education courses and engage in FFA activities. Gliem and Gliem (2000) identified factors that encouraged, discouraged, and would encourage secondary agricultural education students to join the FFA. The main reason students did not join was the negative image they held

of the FFA, while students would join if they felt FFA provided experiences that would eventually lead to good jobs. Gleim and Gleim also examined differences in demographic variables between FFA members and non–members. The findings revealed that there were significantly more Asians, African Americans, and Hispanics enrolled in agricultural education but who were not FFA members. Furthermore, non–members had no interest or minimal interest in agriculture. Recommendations were for FFA to recruit more students of color and to show the benefits FFA has provided for its members in personal development and career opportunities. Although many recruitment efforts have been attempted, Myers, Breja, and Dyer (2004) found that recruitment efforts are often narrowly focused on populations already engaged in agricultural education. They suggested that recruitment efforts be targeted at non–traditional audiences. These scholars further opined that recruiting and retaining students is one of the most pressing issues faced in agricultural education.

In 2004, Talbert and Balschweid sought to determine why students enroll in agricultural education and to describe enrolled students' levels of involvement or non–involvement in FFA. The data revealed that FFA members viewed agriculture courses as exciting, interesting, and beneficial for future plans, while non–members disagreed. Both groups reported "self" as the top reason for enrolling in agriculture courses. In addition, both groups were influenced by the agriculture teacher, parents, and friends. Non–members indicated "other" as their second leading reason to enroll. Examining FFA membership showed that the number one reason students joined was the agriculture teacher. Non–members questioned the importance of joining; their top reason was lack of interest, and amount of time commitment was the greatest barrier. The authors suggested that greater FFA participation among FFA members would encourage non–members to join and become involved.

The literature clearly identified a need to attract under–represented populations in agricultural education and the National FFA Organization. Further, many have opined, asserted, and suggested methods of engaging these students. The project reported in this case study was designed to do just that. From a theoretical perspective, implementation of the project was approached from the position of introducing an innovation into a social system. Accordingly, Rogers' (2003) theories of diffusion of innovation guided development and implementation of the project. Rogers hypothesized that adoption of an innovation goes through five stages: knowledge, persuasion, decision, implementation, and confirmation. He further opined that adoption of an innovation is affected by the relative advantage, compatibility, complexity, trialability, and observability of the innovation. Rogers suggested that when introducing an innovation, it is better to first introduce the innovation to identified opinion leaders. If this group adopts the innovation, others in the social system are then more likely to adopt it.

Purpose

The purpose of this project was to increase diversity in agricultural education high school programs and the FFA, the leadership organization for students in agricultural education, in three schools in south San Antonio, Texas. One research question guided this inquiry: Will implementing a series of interventions lead to an increase in Hispanic student involvement in agricultural education and the FFA? This question was operationalized through four objectives:

1. Describe changes in Hispanic student enrollment in agricultural education and FFA membership.
2. Describe changes in Hispanic student involvement in FFA activities.
3. Describe changes in total FFA chapter activities.
4. Describe changes in parent/alumni activities.

Methods and Procedures

This project employed a case study method to examine how a series of interventions influenced Hispanic student involvement in FFA and agricultural education (Gall, Gall, & Borg, 2003). Activities for this project were funded by a corporate sponsor grant administered through the National FFA Foundation. Three schools in San Antonio, Texas were selected for participation based on three primary criteria: 1) enroll a predominantly Hispanic student population; 2) have existing FFA chapters with under–represented Hispanic participation; and 3) employ teachers who were willing to explore new engagement strategies. The project began in the summer 2004–05 school–year. Observations, data, and reflections presented in this paper represent the first three years of a four–year project.

School 1 was an inter–city school with a Hispanic enrollment of 98 percent with 85 percent of the student population identified as economically disadvantaged by qualifying for free or reduced lunch programs. At the beginning of the project, School 1 had one agricultural education teacher and a teachers' aide. Because of an increase in enrollment, a second teacher was hired at the beginning of the third year. School 2 was on the perimeter of San Antonio and enrolled students from urban, suburban, and rural settings. Seventy–nine percent of the students in School 2 were Hispanic, and 66 percent identified as economically disadvantaged. School 2 had one agricultural education teacher. However because of teacher resignations, a new teacher was involved during each of the three years. School 3 enrolled students from suburban and rural settings. Eight–six percent of the students were Hispanic and 75 percent were identified as economically disadvantaged. School 3 had one full–time agricultural education teacher plus a second teacher with a partial teaching assignment in agricultural education. The portion of the second teacher's time devoted to teaching agricultural education increased each year of the project from one–fourth, to one–half, to three–fourths.

To achieve the purpose of the project, a series of six interventions were designed and implemented with the goal to encourage an increase in participation. Using Rogers (2003) theory as a guide, the project team developed interventions targeted at opinion leaders with the larger goal of wider adoption. This project is on–going, so the long–term changes remain to be seen. The interventions were: 1) provide specific FFA or agricultural education experiences for student opinion leaders; 2) provide specific experiences for parents, alumni, boosters, and school administrators (opinion leaders); 3) provide professional development for the agricultural education teachers (ensure compatibility); 4) supply curricula and educational materials to encourage an expansion of the agricultural education program (trialability); 5) provide access to an on–site project advisor (change agent); and 6) provide project leadership and oversight through a partnership between university faculty and National FFA staff.

Specific FFA or Agricultural Education Experiences for Students

The key goal of this portion of the intervention was to identify and engage key Hispanic students, those identified as opinion leaders. It was believed that providing positive agricultural education and FFA experiences to this group of influential students would create an environment in which non–engaged Hispanic students would be able to observe the benefits their peers received for participation, thus providing an immediate increase in participation and that should lead to sustainable participation. These activities included the State FFA Convention, National FFA Convention, Made for Excellence leadership development program, Washington Leadership Conference, career development events (CDEs), and livestock shows and fairs.

Specific Experiences for Parents, Alumni, Boosters, and School Administrators

Beyond student participation, it was deemed important to garner support of key stakeholder groups to ensure the long–term viability of an agricultural education program. The goal of this portion of the intervention was to identify and engage key stakeholders in agricultural education and FFA activities. These activities provide an opportunity for parents, relatives, alumni members, boosters, and school administrators to experience the value of agricultural education programs and FFA chapters for students. The support of this influential group of people was thought to be critical for the sustainability of project. The project assisted with activities such as attending local and area FFA banquets, State FFA Conventions, Alumni State Leaders Conferences, National FFA Conventions and establishing and/or expanding FFA Alumni chapters or booster club groups.

Professional Development for Teachers

The project team believed that the agricultural education teachers at each school were the single most important key to making sustainable changes in their respective programs. Accordingly the goal of this portion of the intervention was to better equip each teacher with the skills to deliver an agricultural education program that engages students, particularly Hispanic students. Teachers were provided professional development through Lifeknowledge curriculum training, attending Texas Agricultural Science Teachers Professional Development Conferences, Washington Leadership Conference Advisor’s Programs, and National FFA Conventions.

Curricula and Educational Materials

The project team believed that an important part of increasing participation in agricultural education and FFA was to update and expand the courses offered in the agricultural education program in order to appeal to a more diverse student population. Accordingly new curricula and educational materials were introduced. The goal of this portion of the intervention was to provide the teachers with the materials needed to make program adjustments. This part of the intervention was important for immediate and long–term increases in participation. The project provided Lifeknowledge curriculum, specific technical instructional materials identified by the teacher and new FFA instructional materials and manuals.

On–site Advisor (Change agent)

The teachers at each school were engaged daily in increasing Hispanic participation by providing a comprehensive agricultural education program which appeals to a more diverse student population. To do so, the teachers must overcome a variety of challenges. To provide a source for guidance and a single point of contact in facing these challenges, the project provided a change agent who served as the day–to–day project manager and as a liaison between the agricultural education teachers, the corporate partner, and the university/National FFA staff. On average, the advisor visited each of the three schools on a weekly basis. Some key attributes of this project advisor–change agent was a recently retired, successful agricultural education teacher from Texas; a former national NAAE officer, and a Hispanic–American who possessed a passion for increasing participation and leadership opportunities for Hispanic youth.

University and National FFA Leadership and Oversight

Oversight and leadership of the project was provided by university faculty members and staff from the National FFA Organization. This partnership provided a wealth of Texas and national experience in developing agricultural education teachers and programs. The specific personnel involved in the project changed over the span of the project but two things remained constant—all involved possessed the skills necessary to conduct the project and all involved possessed a passion for increasing Hispanic participation in agricultural education and FFA activities.

Data Collection and Analysis

Data were collected face–to–face by the project team during routinely scheduled visits to the schools and through electronic correspondence. Programmatic data were provided by the agricultural education teachers, through Career and Technical Education (CTE) directors and the National FFA Organization. Baseline data from the year preceding the project (2003–04) were difficult to collect and thus some data were missing. In concordance with the employed case–study method, data were analyzed with descriptive statistics and changes were determined by differences in the descriptive statistics as well as recognized qualitative methods.

Outcomes

Objective One: Describe Changes in Hispanic Student Enrollment in Agricultural Education and FFA Membership

Hispanic student enrollment increased at all three schools (Table 1). School 1 increased the number of Hispanic students by 52, School 2 by 65 students, and School 3 by 68 students. As mentioned in the Methods and Procedures section of this paper, increases in enrollment led to the addition of a second agricultural education teacher at School 1, as well as a substantial renovation of the facilities, and a increased portion of a second teacher at School 3. The number of Hispanic FFA members also increased at all three schools (Table 1). The schools gained 54, 14, and 58 Hispanic FFA members, respectively.

Table 1
Changes in Hispanic Student Enrollment and FFA Membership

		School Year				
		2003–04[1]	2004–05	2005–06	2006–07	Change
School		*f*	*f*	*f*	*f*	*f*
1	Hispanic Enrollment	158	167	190	210	+52
	Hispanic FFA Membership	19	40	50	73	+54
2	Hispanic Enrollment	*	9	18	74	+65
	Hispanic FFA Membership	*	4	13	18	+14
3	Hispanic Enrollment	*	72	95	140	+68
	Hispanic FFA Membership	37	62	65	95	+58

*Data missing; [1]Baseline data from the year preceding project implementation.

Objective Two: Describe Changes in Hispanic Student Involvement in FFA Activities

All three schools experienced increased Hispanic student involvement in FFA activities (Table 2). At School 1, the entire officer team was composed of Hispanic students for the three years of the project. The numbers of Hispanic students attending State FFA Conventions increased from zero the year prior to the project to 15 during the third year. Similarly, the number of Hispanic students attending National FFA Conventions also increased from zero to 5 during the period. School 2 had a net increase of one Hispanic FFA officer but the number of Hispanic members attending State FFA Convention increased from zero to 8 and the school had one Hispanic member attend the National FFA Convention each of the three years. School 3 had an increase of two Hispanic FFA officers, attendance at State FFA Conventions by Hispanic members increased from one to 15 and the school had two Hispanic members attend National FFA Conventions each year.

Objective Three: Describe Changes in Total FFA Chapter Activities.

All three schools experienced increases in the FFA activities conducted by their respective FFA chapters (Table 3). At School 1, the number of Leadership Development Event (LDE) teams increased from zero to two and the number of Career Development Event (CDE) teams increased from zero to eight. The number of service projects increased from zero to 12. School 1 went from sending no members to Made for Excellence (MFE) to sending 15 members. Finally, the school that had not had an FFA banquet in recent memory had a banquet with 160 people in attendance. At School 2, teacher turnover caused collecting accurate data early in the project to be problematic. Consequently, the exact number of FFA LDE and CDE teams from the school prior to the project and during the first year of the project is unknown. Data did show that in year 3, the school had 3 LDE teams and 9 CDE teams. The school went from conducting no

local service projects to 12 during the third year. School 2 also went from sending no FFA members to MFE to sending nine members. Prior to the project, School 2 did not have an FFA banquet. During year three, 150 people attended the FFA banquet. For School 3, the number of LDE teams increased by 2 and the number of CDE teams increased by 5. The number of service projects conducted remained constant at five. Prior to the project, School 3 did not send any students to MFE, but in year 3, they sent 15. Unlike the others schools, School 3 had an FFA banquet prior to the start of this project. However, during the course of the project, banquet attendance increased by 150 people—from 200 to 350 attendees.

Table 2
Changes in Hispanic Student Involvement in FFA Activities

		School Year				
		2003–04[1]	2004–05	2005–06	2006–07	Change
School	FFA Activity	*f*	*f*	*f*	*f*	*f*
1	Hispanic FFA Officers	6	6	6	6	0
	Hispanic Members at State FFA Convention	0	8	12	15	+15
	Hispanic Members at National FFA Convention	0	2	3	5	+5
2	Hispanic FFA Officers	*	*	1	2	+1
	Hispanic Members at State FFA Convention	0	4	3	12	+8
	Hispanic Members at National FFA Convention	0	1	1	1	+1
3	Hispanic FFA Officers	2	0	1	4	+2
	Hispanic Members at State FFA Convention	1	1	6	15	+14
	Hispanic Members at National FFA Convention	0	2	2	2	+2

*Data missing; [1]Baseline data from the year preceding project implementation.

Objective Four: Describe Changes in Parent/Alumni Activities

All three schools increased the number of parents or alumni engaged in activities to support chapter activities (Table 4). At School 1, since the project began, an FFA Alumni group was formed that had 16 Hispanic members by the end of the third year. From this group, the school went from zero to four members that participated in the Alumni State Leaders Conference. School 2 also formed an Alumni Chapter that had 20 members by the end of the third year, seven of whom were Hispanic. This school also went from zero to four members attending the Alumni State Leaders Conference. School 3 saw similar growth, by forming an

Alumni Chapter that had 20 members at the end of year three, half of whom were Hispanic. This school also went from zero to four members attending the Alumni State Leaders Conference.

Table 3
Changes in Total FFA Chapter Activities

		School Year				
		2003–04[1]	2004–05	2005–06	2006–07	Change
School	FFA Activity	*f*	*f*	*f*	*f*	*f*
1	Lead. Dev. Event Teams	0	1	1	2	+2
	Career Dev. Event Teams	0	1	2	8	+8
	Made for Excellence Attendance	0	0	0	15	+15
	Service Projects	0	1	4	12	+12
	FFA Banquet Attendance	0	80	120	160	+160
2	Lead. Dev. Event Teams	*	*	4	3	–1
	Career Dev. Event Teams	*	*	3	9	+6
	Made for Excellence Attendance	0	9	12	9	+9
	Service Projects	0	1	3	12	+12
	FFA Banquet Attendance	0	60	85	150	+150
3	Lead. Dev. Event Teams	3	5	5	5	+2
	Career Dev. Event Teams	4	5	6	9	+5
	Made for Excellence Attendance	0	15	16	15	+15
	Service Projects	5	5	5	5	0
	FFA Banquet Attendance	200	250	300	350	+150

Note. Texas differentiates between competitive events that address leadership skills and those that address career skills; *Data missing; [1]Baseline data from the year preceding project implementation.

Table 4
Changes in Parent/Alumni Involvement in FFA Activities

		School Year				
		2003–04[1]	2004–05	2005–06	2006–07	Change
School	Activity	*f*	*f*	*f*	*f*	*f*
1	Alumni (Booster) Membership					
	Hispanic	0	8	12	16	+16
	Non–Hispanic	0	0	0	0	0
	Attendance at Alumni State Leaders Conference	0	1	2	4	+4
2	Alumni (Booster) Membership					
	Hispanic	0	2	2	7	+7
	Non–Hispanic	0	6	11	13	+13
	Attendance at Alumni State Leaders Conference	0	1	2	4	+4
3	Alumni (Booster) Membership					
	Hispanic	0	0	2	10	+10
	Non–Hispanic	0	0	8	10	+10
	Attendance at Alumni State Leaders Conference	0	1	2	4	+4

[1]Baseline data from the year preceding project implementation.

Conclusions and Lessons Learned

During the first three years of this project, all three schools experienced increases in Hispanic enrollment in the agricultural education program and Hispanic membership in the FFA. All three schools also experienced an increase in the number of Hispanic students participating in FFA activities. Additionally, each of the schools increased the total number of FFA activities in which they participated. Each of the schools established FFA Alumni chapters with parents and/or boosters engaged in activities to support students.

Agricultural education and the National FFA Organization can be appealing to Hispanic students. The analysis of this experience demonstrated that when provided with encouragement, recognition, and resources, agricultural education teachers can enroll Hispanic students and engage them in meaningful FFA activities. Additionally, the parents of these students can be engaged through development of an alumni affiliate. These accomplishments can be made

through designing and implementing a series of interventions based on Rogers' (2003) theories of diffusion of innovation by identifying key opinion leaders and providing targeted experiences to engage these individuals. This experience validated findings of Talbert and Balschweid (2004) about the differences between FFA members and non–FFA members.

Throughout the project substantial resources were made available for the three schools. Consequently the extent that these same interventions could be replicated with fewer resources is unknown. It would be useful to know if similar outcomes could be obtained with less outside funding and outside personnel. If so, those interventions could be transformational for agricultural education.

The results of this experience suggest that similar intervention strategies have potential for other programs. The National FFA Organization and interested corporate partners are exploring similar projects in other locations. Lessons learned from this experience are being shared with agricultural education teachers. With each of these intervention strategies relevant data should be collected to examine the suitability in a new context.

Because of the demographics of the communities, this project focused primarily on engaging Hispanic students. Although the Hispanic population is expected to increase there are other ethnic groups that are under–represented in agricultural education, particularly African–Americans, Asian–Americans, and Native Americans. The extent to which these intervention strategies are appropriate for other populations is yet to be determined.

Lessons Learned (A Three–Year Reflection)

With the considerable amount of time spent working on the project over its initial three years, the project team reflected on lessons learned. The following are offered to others who may consider similar projects:

1. Collins (2005) recognized an early issue is "First Who–getting the right people on the bus within social sector constraints" (p. 5). Early dialogue was critical in the clarification of goals, identification of partner schools, matching needs with opportunities and "getting the right people on the bus." An experienced colleague recommended listening closely to the first thing that partners tell you; that is what they will ultimately do. He was correct.

2. After preliminary groundwork, the initiative was announced and celebrated at a neutral site involving all school partners and policy makers. Key school leaders, teachers, students and partners made a public commitment to the goals of the project. Collins (2005) illustrated this method as an "inflection point" that begins separation of "good–to–great cases" from "good, not great comparison cases" (p. 2). After this public commitment, there was no turning back.

3. The commitment to a four–year project by the corporate sponsor was critical for organizational change. Step–by–step spaced vs. massed activities for sustainable change proved to be a key principle for long–term adjustments and shared benefits.

4. Collins (2005) was quite candid—"it doesn't really matter whether you can quantify your results. What matters is that you rigorously assemble evidence—quantitative or qualitative—to track your progress (p. 7).

5. The success of any diffusion of innovation hinges on communication, communication channels, communication networks, and communication proximity (Rogers, 2003). Newman (2005) noted that "in order to thrive, systems must also contain positive feedback, defined as feedback which reinforces a change or trend. . . . Positive feedback can reinforce a small event again and again until it becomes a system–wide phenomenon" (p. 2). Positive feedback loops were critical to the incremental success of the project. Drucker (1990) reminded us the "the most important ***do*** is to build the organization around information and communication instead of around hierarchy" (p. 115).

6. The importance of the change agent, his creditability and his role as a linker in incremental change is widely recognized (Rogers, 2003). The influence of the project advisor–change agent increased incrementally throughout the first three years of this work. Rogers (2003) concluded that "change agents face two main problems: (1) their social marginality, due to their position midway between a change agency and their client system, and (2) information overload, the state of an individual or a system in which excessive communication inputs cannot be processed and used, leading to breakdown" (p. 400). Further, Rogers recognized seven roles of the change agent. This three–year experience validated the importance of the change agent and the critical roles that he played.

7. Often the challenges to diffusion of innovation come from within the culture rather than from external resistance. Initially there was "an attitude of exclusivity" from within the culture that resisted diffusion of innovation from corporate partners who were outside the culture. Time proved that there was plenty of work to be done and that there was room for many champions who hold to the same disciplined set of values, beliefs, and principles.

8. Rogers (2003) recognized "the role of champions" in the adoption process (p. 414). After an initial year that provided some tangible experiences and a marginal diffusion of diversity, the power of champions became evident. Champions emerged in the guise of parents, relatives, school administrators, school board members, existing FFA members and community leaders. These champions provided public testimonies, quiet encouragement and timely community support. Rogers noted that "champions in an organization play a role something like that of an opinion leader in a community" (p. 415). A conscience decision shifted energy from the internal project leaders to external champions who were advocates for positive experiences for all students. This may prove to be the most important strategy for sustainable change and for expanding the opportunities of agricultural education and FFA for all students.

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Discussant Remarks
Marcus Comer
North Carolina A&T State University

FFA Chapters Involved in Civic Engagement Describe Member Role and Context of Leadership Activates Critique

This study served to examine the interaction between adults and FFA members who participated in Civic leadership activities. The purpose was to see how adults view and value the input of young adults.

The authors provided a thorough discussion of the background and need for the study. The theoretical framework is strong and interesting. The objectives are clear and concise. The paper though is not very clear especially in regards to the findings. Would it help if the instruments were included or questions presented with the frequencies. Starting with table two I became confused regarding the number of cases reported.

This study has implications for use in the classroom as well as other youth organizations. There are implications for outside of the educational arena as well.

Exploring Goal-Setting as a Tool for Leadership Development

This paper was an exploratory study based on Goal-setting Theory. The authors should be commended for conducting well designed and sophisticated study. The authors have provided a thorough discussion of the theoretical framework.

The researchers should be commending for the time and efforts in developing the instrument. It is clear that a lot of effort was placed in ensuring the validity of the survey. However, it was not clear how the questions for the survey were developed. Goal setting is a very personal process. I'm not sure how much details you can capture through a paper survey alone. I recommend conducting focus groups and revisiting the survey questions.

Implications

This study has implications for use in not only the professional development arena but in the classroom as well. There are also implications for use in program planning, and program evaluation.

Professional Development for Local Volunteer Leaders: A Conceptual Plan Critique

This paper was an applied research project that paper presented a conceptual model based on Knowles Andragogy model for planning & facilitating adult Ed. The authors have adapted the model for use in planning volunteer leadership programs.

The model was applied to a leadership program developed by farm bureau. The authors should be commended for a well written paper. However the adapted model so closely resembles Knowles's Andragogy Model. It is not clear what the benefits of the adoption are.

The Frame work to address authors developed the needs of grassroots Organization I agree with the Authors that this applied process has implications of success among such groups because this process involves everyone in the planning process.

Engaging Hispanic Students in Agricultural Education and the FFA : A Three-Year Case Study Critique

This was a study that addressed the problem of diversity in FF; a problem that the profession has been dancing around for the past ten years. It was very refreshing too finally see a study address the problem through action. The study is very well written and easy to understand. Another strength of the study is its direct relation to the framework. The purpose was to put the theories present into practice.

The study discussed the specific activities implemented to engage students, parents, alumni, and administrators, however specifics of the professional development provided for teachers, nor the educational materials provided not discussed in detail. It would be nice to have these details and necessary for anyone interested in replicating this study.

The data presented only provides rate of change in enrollment although this was a case study it would have been good for the authors' to discuss the data collection methods and procedures in more detail.

The authors' did not give implications they state that the study only focused on engaging Hispanic students, however these strategies seem to have implications of working with other under-represented ethnic groups.

STUDENT EXPERIENCES AS PEER LEARNING ASSISTANTS IN THE LIFE, AGRICULTURAL, AND NATURAL SCIENCES

Anna Ball, University of Florida & Neil Knobloch, Purdue University

Abstract

While other colleges and universities may have experimented with various models of peer-assisted learning (Miller, Groccia, & Miller, 2001), there is no record of a college of agriculture, food and natural resources adopting the undergraduate-faculty partnership approach to date. Furthermore, with calls to educational reform focused so solidly on learner-centered teaching paradigms, it stands to reason that there is a need to investigate the effectiveness of learner-centered approaches to teaching through the lens of the peer teacher. The purpose of the study was to explore the development of a model for using peer learning structures in undergraduate education to make learning more meaningful and develop interpersonal and communication skills. Forty-one students who served as peer learning assistants (PLA) in nine undergraduate courses at Southern Illinois University, the University of Illinois at Urbana-Champaign, Purdue University, Lincoln University, the University of Missouri at Columbia, and The Ohio State University participated in this study. It was concluded that the nature of the tutor experience was more positive regarding development of meaningful learning as perceived by PLA's and the nature of the peer teaching assistant/educator experience was more positive in regarding development of career skills as perceived by PLA's. The study raises interesting implications for the perceived value of utilizing peers in different roles within the teaching and learning experience.

Introduction

Current and past calls for reform in higher education consistently echo that teaching in learning in colleges must be improved, asserting that graduates leave institutions under-prepared and as a result are incompetent workers and citizens (Boyer Commission 1998; Kember, 1997; Kleotka, 2003, Scarlett, 2004). Regarding the disciplines of agriculture, food, and natural resources, reform efforts to improve practices challenge colleges nationwide to re-think the *purpose* and *delivery* of professional education (National Research Council, 1992). As recently as five years ago, the Kellogg Commission on the Future of Land Grant Universities called for similar educational reform, indicating that, "unless public colleges and universities become the architects of change, they will become its victims" (1999, p. 1). Each of the aforementioned sources upholds the ongoing theme of re-thinking, re-shaping, and ultimately improving teaching and learning in college classrooms by placing a greater emphasis the nature of the student experience as it relates to effective teaching (Menges, 2001; NASULGC, 2001).

Despite such compelling pleas for change, teaching in college classrooms remains predominately a traditional lecture-based, teacher-directed model of student assimilation and recitation of factual information (Gardiner, 1994). Yet, a body of literature in teaching and learning supports the notion that meaningful learning occurs when students are engaged in the learning process themselves, and with each other as a community of learners. Chickering and Gamsun (1987) in their report on the *Seven Principles for Good Practice in Undergraduate Education* noted that good practices encourage student-faculty contact and active learning,

among other factors. More recent adaptations to the report (Ewell & Jones, 1996) indicated that a quality curriculum allows for synthesis, application, and integration of education and experience and that quality instruction further supports active learning.

Even with an abundance of empirical and practical literature regarding learner-centered methods for teaching, professors' knowledge and beliefs about good teaching and learning are primarily acquired through trial-and-error, reflecting on feedback, and self-evaluations (Menges, & Austin, 2001). Faculty members engaged in teaching rely on knowledge of the teaching and learning process acquired through their own past experiences as students (Hativa, 2001), which have traditionally been teacher-centered. Insufficient knowledge of the teaching and learning process negatively affects professors' classroom performances (Hativa, 2001). Furthermore, professors are faced with conflicting pressures to teach undergraduates, conduct research, and achieve tenure (Beard, 1965; Boyer, 1990; Scarlett, 2004). Not only are professors unprepared to teach, the nation's universities lack programs to help faculty learn to teach (Scarlett, 2004). Menges and Austin (2001) called for a shift from efforts to improve teaching to efforts that improve student learning. Professors need to increase their repertoires of teaching strategies (Hativa, 2001) that go beyond the transmission of knowledge, and they need assistance and guidance to make this transition (Prosser, Ramsden, Trigwell, & Martin., 2003; Sherman, Armistead, Fowler, Barksdale, & Reif, 1987).

One barrier to the successful incorporation of learner-centered approaches in college classrooms is faculty knowledge and understanding of effective methods for learner-centered teaching. In short, faculty members by and large know that they should be more learner-centered in their teaching, but they lack the knowledge regarding "how" to do so. Another obstacle to the successful incorporation of novel approaches in classroom teaching is time (Boice, 2000). Some faculty members have the knowledge and skills and merely lack the time needed to develop and implement learner-centered approaches in their teaching. Another combination of barriers to implementing these techniques in college classrooms is that learner-centered models take more faculty time *within* the classroom and faculty members often do not have the financial resources required to support the hiring of graduate teaching assistants that are needed to extend the learning process. With such seemingly insurmountable obstacles, faculty members are left feeling overworked and underappreciated in this 'publish or perish' model of teaching. It is no great surprise then that learner-centered paradigms for teaching have been slow to achieve widespread implementation across universities nation-wide. Research is needed regarding innovative models for learner-centered teaching that extend faculty in the classroom and show positive gains for students within the total learning experience.

Theoretical/Conceptual Framework

The creation of undergraduate-faculty teaching partnerships has been indicated in the literature as a potential vehicle to bridge the faculty-student and student-student gulf that exists in traditional teacher-centered paradigms, and thus served as the framework for this study. An undergraduate-faculty partnership can manifest itself in the instructional setting in a number of ways, shaped by the nature and context of the faculty member, the course and its students. Typical models include one or more upper-level or honors-level undergraduate students, called Peer Learning Assistants (PLA's) aiding students in peer-learning groups in laboratory,

discussion, or even large-lecture sections of a course (Miller, Groccia, & Miller, 2001). In addition, PLA's have been utilized in distance education, in writing intensive courses as peer mentors, and in problem-based learning courses that rely heavily on the use of group learning (Miller, Groccia, & Miller, 2001). The compensation for PLA's manifests itself in a number of ways, but typical models include wages or course credit. PLA's can be paid hourly assistants, students participating in honors programs, independent study, internships, or other for-credit experiences. In some instances, PLA's are honors students enrolled in a course and acting as students *and* PLA's within the same course (Miller, Groccia, & Miller, 2001). The Tomorrow's Professor Listserve Message #299 called undergraduate-faculty partnership learning models, "a radical approach to undergraduate education….that is based on two ideas that…[are]…quite compelling; that one of the best ways to learn something is to teach it to others, and that in higher education, everyone from freshmen, to graduate students, to senior professors, are part of an intellectual community in which everyone is both a teacher and a learner," (see: http://sll.stanford.edu/projects/tomprof/newtomprof/postings/299.html).

As the instructional models profiled in Student-Assisted Teaching: A Guide to Faculty-Student Teamwork (Miller, Groccia, & Miller, 2001) and others demonstrate, the creation of undergraduate-faculty teaching partnerships have produced both positive cognitive and affective outcomes for both undergraduate learning assistants and the faculty member (Devin-Sheehan, Feldman, & Allen, 1976; Ethly & Larson, 1980; Gartner, Kohler, & Riessman, 1971) as well as students enrolled in the course (Cohen, Kulik & Kulik 1982; Fuchs, Fuchs, Mathes, & Simmons, 1997; Gartner, Kohler, & Riessman, 1971; Goldschmid & Goldschmid, 1976; Rubin & Hebert, 1998).

Faculty productivity is increased due to the fact that peer-learning assistants are able to form a valuable addition to a ***total instructional team***. By transforming traditional teacher-centered paradigms to personal, active learning communities, peer learning assistants provide one-to-one interaction with students, enhancing student success while allowing faculty time to exercise their expertise in curricula design and course improvement. Undergraduate-faculty partnerships help facilitate student-faculty, as well as student-student partnerships in an engaged community of scholars. Finally, increased student satisfaction, student retention, and student success resulting from undergraduate-faculty partnerships has the potential to impact the agriculture, food, and natural resource industry in very powerful ways. Students instructed in peer learning groups become actively engaged with their fellow classmates, undergraduate learning assistants, and course instructors in a *deeper learning* initiative (Cohen, Kulik & Kulik 1982; Fuchs, Fuchs, Mathes, & Simmons, 1997; Gartner, Kohler, & Riessman, 1971; Goldschmid & Goldschmid, 1976; Rubin & Hebert, 1998).

While other colleges and universities may have experimented with various models of peer-assisted learning (Miller, Groccia, & Miller, 2001), there is no record of a college of agriculture, food and natural resources adopting the undergraduate-faculty partnership approach to date. Furthermore, with calls to educational reform focused so solidly on learner-centered teaching paradigms, it stands to reason that there is a need to investigate the effectiveness of learner-centered approaches to teaching through the lens of the peer teacher. As faculty develop their own unique models of learner-centered teaching approaches utilizing peer teachers in a

variety of different roles, evidence is needed to document the relative effectiveness of these approaches on student development. Does PLA involvement in peer learning activities enhance leadership, citizenship, interpersonal teamwork, and problem-solving abilities that have been espoused as paramount to the success of a productive and engaged society of individuals? Do different types of peer learning structures have more potential for enhancing the learning experience for PLA's? Is, as the anecdote indicates, teaching a concept to others truly the "best" way to learn such material? The answers to such questions can help faculty members in colleges of agriculture and life sciences, with limited time and resources, make mindful decisions regarding changing their teaching approaches to more learner-centered paradigms.

Purpose and Objectives

The purpose of this study was to explore the development of a model using peer learning structures in undergraduate education to make learning more meaningful and develop leadership and career skills in the PLAs. As such, the researchers sought to answer the following questions: (1) How did undergraduate peer learning assistants perceive their peer teaching experiences? (2) To what extent did the perceptions of peer tutors and peer teachers differ regarding meaningful learning and career development? (3) Did the peer teachers engaged in different types of peer teaching experiences perceive their experiences differently on specific items within the two factors of meaningful learning and career development?

Procedures

This descriptive study was conducted to explore a preliminary conceptual model of using peer learning structures to engage and develop students in undergraduate courses in the context of life, agricultural, and natural sciences. Forty-one students who served as peer learning assistants in nine undergraduate courses at Southern Illinois University, the University of Illinois at Urbana-Champaign, Purdue University, Lincoln University, the University of Missouri at Columbia, and The Ohio State University participated in this study. Student peer-learning assistants were selected by the professors who were part of a larger grant project. Although the professors of the larger project participated in a faculty development workshop and were provided resources on peer learning assistant structures, each developed a peer learning structure to help achieve their particular desired outcomes and fit within the context of their individual courses.

After studying the nine different course structures developed by the participating professors for utilizing PLAs, the researchers used an inductive approach to determine that the roles of PLAs fit into two or three categories, based on (a) the level of risk and responsibility, and (b) structure and instructional planning the PLAs were required to assume as part of their roles in the course. These roles included peer tutors, peer outreach educators and peer teaching assistants. The researchers agreed that the roles of peer outreach educator and peer teaching assistant were similar due to the need to plan for instruction (considered a high structure and instructional planning task). However, these two particular roles were determined to be slightly different based on whether or not the teaching occurred outside of a familiar classroom environment (considered a high risk and responsibility task). The role of the peer tutor was determined to be distinct from that of a peer outreach educator and peer teaching assistants

because peer tutors were not able to create or execute unique teaching plans (considered low structure and instructional planning tasks) but were required to anticipate potential problems students might bring to their attention (also considered a low risk and responsibility task). Based upon these levels of (a) risk and responsibility and (b) structure and instructional planning, types of peer teaching experiences were broadly categorized into two areas: students acting as peer tutors/coaches were designated as Type 1 and students acting as peer teaching assistants/educators were designated as Type 2.

A twenty-item questionnaire which included demographic items was designed based upon a review of the literature in peer learning and the use of undergraduates as teaching partners in college classrooms. Questionnaire constructs included student engagement in meaningful learning (10 items) and career development (6 items), on a 4-point Likert-type scale with anchors at 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. The questionnaire was reviewed by a panel of experts for face and content validity. A confirmatory principal components analysis was conducted on the dependent variables, indicating that the two factors of meaningful learning and career development explained 52% of the variance. The construct of student engagement in meaningful learning had a reliability coefficient of 0.85, and the reliability of the construct of career development was 0.82. A two-step cluster analysis was used to verify the two clusters of PLA's: (a) peer tutors (n = 10; 24%) and (b) peer teaching assistants or educators (n = 31; 76%). Discriminant analysis confirmed the two clusters accurately classified 81% of the cases. Means and standard deviations were reported for the two dependent variables and the items within each dependent variable. A limitation of this study was the small sample size. As such, we reported means and standard deviations of the items within the dependent variables because medians and frequencies did not provide a meaningful interpretation of the ordinal data. Because we did not wish to generalize the findings of the individual items, effect sizes were calculated to determine practical differences of the items rather than determining statistical significant differences. One-way ANOVA was conducted to determine significant differences between (a) peer tutors and (b) peer teaching assistants or educators regarding their perceptions of meaningful learning and career development. Tests of significance were established *a priori* at 0.05, and effect sizes were computed to determine group practical differences. Because of the small, nonprobablistic sample, tests of normality were conducted and the data met the assumption of normal distribution. Because of the exploratory nature of this pilot study, the results should not be generalized beyond the nine undergraduate courses and the participants in this study.

Findings

For Objective 1, the perceptions regarding meaningful learning and career skills development for peer teachers who engaged in a variety of peer teaching experiences were described (Table 1). Peer learning assistants, as a whole, agreed that: engaging as a peer teacher or a peer tutor increased their self confidence (M = 3.40), helped them develop a deeper understanding of the course content (M = 3.36), helped them develop new ways of reasoning about the subject matter (M = 3.33), that they were more motivated to learn the content in the course (M = 3.26), had developed a deeper understanding of application of the content to the real world, (M = 3.27), were challenged to learn the content of the course (M = 3.15), had developed greater problem-solving abilities (M = 3.07), thought about the course content in different ways

Table 1.

Perceptions of peer learning assistants with peer tutoring and peer teaching roles in the classroom by frequency and percent (n = 41)

Item: As a result of serving as a PLA in the course, the following were developed:	1 SD	2 D	3 A	4 SA	M (SD)
Increased self-confidence.	0	0	25 (59.5)	17 (40.5)	3.40 (.497)
Deeper understanding of content in course.	0	2 (4.8)	23 (54.8)	17 (40.5)	3.36 (577)
Developed new ways of reasoning about the subject.	1 (2.4)	3 (7.1)	19 (45.2)	19 (45.2)	3.33 (.721)
More motivated to learn the content.	1 (2.4)	2 (4.8)	26 (61.9)	11 (26.2)	3.26 (.735)
Deeper understanding of content in the real world.	0	5 (12.2)	22 (53.7)	12 (29.3)	3.27 (.742)
Challenged to learn the content.	2 (4.9)	6 (14.6)	17 (41.5)	16 (39.0)	3.15 (.853)
Developed greater problem-solving abilities.	0	7 (17.1)	24 (58.5)	10 (24.4)	3.07 (.648)
Think about the content in different ways.	0	13 (31.7)	17 (41.5)	11 (26.8)	2.95 (.773)
Increased leadership abilities.	0	1 (2.4)	15 (36.6)	25 (61)	3.59 (.547)
Increased teamwork abilities.	0	6 (14.6)	15 (36.6)	20 (48.8)	3.34 (.728)
Increased interpersonal skills.	0	1 (2.4)	23 (56.1)	17 (41.5)	3.39 (.542)
Made a contribution to the teaching in the course.	0	1 (2.4)	12 (29.3)	28 (68.3)	3.66 (.530)
Felt like part of a community of learners in the course.	1 (2.4)	5 (12.2)	17 (41.5)	18 (43.9)	3.27 (.775)
Improved communication skills.	0	1 (2.4)	19 (46.3)	21 (51.2)	3.49 (.553)
Increased motivation to pursue a career related to the course content.	1 (2.4)	8 (19.5)	23 (56.1)	8 (19.5)	3.00(.775)
Increased motivation to pursue a teaching-related career.	3 (7.3)	19 (46.3)	11 (26.8)	6 (14.6)	3.63 (.994)
Increased understanding of working in a professional setting.	0	1 (2.4)	26 (63.4)	13 (21.7)	3.34 (.575)
Learned more of the content in the course.	0	5 (12.2)	2 (63.4)	10 (24.4)	3.12 (.600)
More responsible.	1 (2.5)	5 (12.5)	24 (60.0)	9 (22.5)	3.10 (.744)
More engaged in the learning process in the course.	2 (4.9)	5 (12.2)	16 (39.0)	17 (41.5)	3.24 (.888)

Note. 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree.

(*M* = 2.95), increased their teamwork abilities (M = 3.34), increased their interpersonal skills (*M* = 3.39), felt like a part of a community of learners in the course (*M* = 3.27), improved their communication skills (*M* = 3.49), felt increased motivation to pursue a career related to the course content (*M* = 3.00), felt increased motivation to pursue a teaching-related career (*M* = 3.63), developed an increased understanding of working in a professional setting (*M* = 3.34), learned more of the course content (*M* = 3.12), were more responsible (*M* = 3.10), and were more engaged in the learning process in the course (*M* = 3.24). Peer learning assistants strongly agreed that they had increased career development (*M* = 3.59) and had made a contribution to the teaching in the course (*M* = 3.66) as a result of engaging as a peer tutor or a peer teacher.

For Objective 2, the extent to which the perceptions of peer tutors and peer teaching assistants/educators differed in regard to the development of meaningful learning and career development were examined (Table 2). Peer teachers who served as tutors agreed that the experience was meaningful for learning (*M* = 3.24) and for developing career skills (*M* = 3.20). Peer teachers who served as peer teaching assistants/educators that the PLA experience was meaningful for learning (*M* = 3.14) and strongly agreed that the experience developed their career skills (*M* = 3.55). A comparison of the means between the peer tutors and teaching assistant/educators revealed no significant differences between the mean perceptions of meaningful learning (*F* = .11), with a small effect size (*d* = .18). A comparison of the means between the peer tutors and teaching assistant/educators revealed significant differences between mean perceptions of career development (*F* = 6.57), with a medium effect size (*d* = .78).

Table 2.

Differences between PLA tutors in regard to meaningful learning and career development

Type of PLA	Meaningful Learning				Career Development			
	M	*SD*	*F*	Effect size	*M*	*SD*	*F*	Effect size
PLA as Tutor (*n* = 10)	3.24	.5	.11	.18	3.4	.4	6.57*	.78
PLA as Teaching Assistant/ Educator (*n* = 31)	3.14	.5			3.3			

**p = .01*

For Objective 3, the differences between the peer tutors' and peer teaching assistant/educators' perceptions of specific items within the dependent variables of meaningful learning and career development were compared. Career skill development, as defined on the questionnaire, was addressed by items regarding student perceptions of their career development, teamwork abilities, interpersonal skills, contribution to the work of teaching the class, communication skills, and working in a professional environment (Table 3). The peer tutors agreed that serving

as a peer learning assistant developed their career skills (*M* = 3.20), interpersonal skills (*M* = 3.10), and communication skills (*M* = 3.40). In addition, the peer tutors agreed that serving as a PLA developed their understanding of working in the real world (*M* = 2.20) and helped them feel like they made a contribution to the teaching in the course (*M* = 3.30). The peer tutors disagreed that serving as a PLA helped to increase their teamwork abilities (*M* = 2.90). Peer teaching assistants/educators strongly agreed that serving as a PLA increased their career skills (*M* = 3.71), improved their communication skills (*M* = 3.52), and helped them feel a part of the total contribution to the learning in the course (*M* = 3.77). The peer teaching assistants/educators agreed that the PLA experience helped them develop teamwork abilities (*M* = 3.48), increased their interpersonal skills (*M* = 3.48), and helped them develop an increased understanding of working in a professional setting (*M* = 3.36). Items regarding increased leadership abilities, teamwork abilities, interpersonal skills and made a contribution to the teaching in the course all had medium to large effect sizes, respectively.

Table 3.

Perceptions of peer tutors and peer teaching assistants/educators on the role of the PLA experience on career skills development

Item: As a result of serving as a PLA in the course, the following were developed:	Peer Tutors *M* (*SD*) *n = 10*	Peer TA's/ Educators *M* (*SD*) *n = 31*	Effect Size *D*
Increased leadership abilities.	3.20 (.63)	3.71 (.46)	1.01
Increased teamwork abilities.	2.90 (.74)	3.48 (.68)	.84
Increased interpersonal skills.	3.10 (.57)	3.48 (.51)	.73
Made a contribution to the teaching in the course.	3.30 (.68)	3.77 (.43)	.94
Improved communication skills.	3.40 (.52)	3.52 (.57)	.22
Increased understanding of working in a professional setting.	3.20 (.63)	3.36 (.49)	.30

Note. Effect sizes: Trivial = 0 - .19, small = .20 - .49, medium = .50 - .79, large = .80 or higher.

Meaningful learning, as it was defined on the questionnaire was addressed by items regarding student perceptions of gaining a deeper understanding of the content, developing new ways of reasoning about the subject, increased motivation for learning, an understanding of the content application to the real world, being challenged to learn the content, wanting to pursue a teaching related career, learning the content better, being more responsible, and being more engaged with the content (Table 4). The peer tutors strongly agreed that the PLA experience helped them to develop a deeper understanding of the content in the course (*M* = 3.50), that they had developed new ways of reasoning about the subject (*M* = 3.60), and that they were more motivated to learn the subject (*M* = 3.50). The peer tutors agreed that the PLA experience helped them develop a deeper understanding of how the content applied to the real world (*M* = 3.20), that they had learned more of the course content (*M* = 3.10), that they were more responsible (*M* = 3.40), and

that they were more engaged in the learning process in the course (*M* = 3.20). The peer tutors disagreed that they were more challenged to learn the course content (*M* = 2.80) or that they wanted to pursue a teaching related career (*M* = 2.90). The peer teaching assistants/educators agreed that they held a deeper understanding of the course content (*M* = 3.21), had developed new ways of reasoning about the subject (*M* = 3.25), were more motivated to learn (*M* = 3.19), they a deeper understanding of the application of the content to the real world (*M* = 3.29), were challenged to learn the content (*M* = 3.26), learned more in the course as a whole (*M* = 3.13), were more responsible (*M* = 3.00) and were more engaged in the learning process in the course (*M* = 3.13). The peer teaching assistants/educators disagreed that they wanted to pursue a teaching related career as a result of the PLA experience (*M* = 2.55). The items including: developing new ways of reasoning about the content, more motivated to learn the content, was challenged to learn the content, and was more responsible as a result of the PLA experience all had medium to large effect sizes respectively.

Table 4.

Perceptions of peer tutors and peer teaching assistants/educators on the role of the PLA experience on meaningful learning

Item: As a result of serving as a PLA in the course, the following were developed:	Peer Tutors M (SD) *n = 10*	Peer TA's/ Educators M (SD) *n = 31*	Effect Size *d*
Deeper understanding of content in course.	3.50 (.71)	3.31 (.54)	.33
Developed new ways of reasoning about the subject.	3.60 (.70)	3.25 (.72)	.49
More motivated to learn the content.	3.50 (.71)	3.19 (.74)	.42
Deeper understanding of content in the real world.	3.20 (1.14)	3.29 (.59)	.12
Challenged to learn the content.	2.80 (.79)	3.26 (.86)	.55
Want to pursue a teaching related career.	2.90 (1.20)	2.55 (.93)	.35
Learned more of the content in the course.	3.10 (.57)	3.13 (.62)	.05
More responsible.	3.40 (.70)	3.00 (.74)	.55
More engaged in the learning process in the course.	3.20 (.92)	3.26 (.89)	.07

Note. Effect sizes: Trivial = 0 - .19, small = .20 - .49, medium = .50 - .79, large = .80 or higher.

Conclusions, Recommendations, Implications

First, it was concluded that students serving as PLA's, regardless of the nature of the PLA experience, perceived positive gains as a result of their experiences. This finding supported the literature base regarding peer teaching (Devin-Sheehan, Feldman, & Allen, 1976; Ethly & Larson, 1980; Gartner, Kohler, & Riessman, 1971). The overly positive responses by PLA's in regard to their peer teaching experiences could imply that the idea of teaching as a vehicle to one's own learning and development was at least supported in this study. Given the small sample sizes and limitations of this study to be generalized beyond similar courses of similar students in similar universities, it is recommended that further research be conducted to examine the impact of peer teaching as a vehicle for individual learning and development in courses.

It was further concluded that the nature of the tutor experience was more positive in regard to developing meaningful learning as perceived by PLA's and the nature of the peer teaching assistant/educator experience was more positive in regard to developing career skills as perceived by PLA's. This finding is neither supported nor refuted in the current literature base on peer teaching, as no previous studies have been conducted which specifically delineate how different types of peer teachers might perceive their experiences differently. This finding indicates some interesting implications regarding the nature of the total PLA experience and how different roles as peer teachers might shape these experiences. It could stand to reason that serving in the role of a tutor, while engaging the peer teacher with students with respect to the content, is a low structure and planning activity in terms of preplanning peer teacher themselves must do before they interact with their peers in an instructional role. Furthermore, the peer educator is a high risk and responsibility role compared to the peer teaching assistant role because of the additional complexity and uncertainty created by performing in unfamiliar contexts beyond a college classroom. The peer tutor/coach type of PLA could develop an increased understanding of course content as a result of tutoring others in the content, yet since they are not responsible for creating and executing their own lesson plans, they may not necessarily develop career skills. Conversely, student PLA's serving in roles where they must take material that they know, and develop and execute a teaching plan on that material (which students will be responsible for learning) could be engaging in experiences they perceive as having higher degrees of structure and instructional planning. Thus, while they may not perceive that their content learning was developed more deeply, they may perceive greater gains in career development. Moreover, when the stakes are high (i.e., a peer coach or educator feels accountable for students' successes and failures) or when the context is less familiarity and creates a feeling of more uncertainty, peer coaches and educators experience high risk and responsibility in their roles. We believe PLA's with high risk and responsibility will experience a greater impact on their learning and development as long as they are guided and supported in their instructional roles. More studies need to be conducted regarding specific, observable behaviors of both career development and meaningful learning and how different PLA experiences might impact each based on the degree of (a) structure and planning and (b) risk and responsibility.

This study served as a brief exploration into the nature of peer teaching as a vehicle for deeper student learning and development. At a minimum, the study made strides to answering the adage as to whether or not teaching is a viable way of learning material. The study also explored the influence roles and context on PLA's experiences and outcomes. Perhaps more importantly, the study will challenge other researchers in faculty development to further explore the ways in which professors might utilize undergraduates as teachers in their courses, both from the impact on enhancing the classroom teaching experience as well as for enhancing the learning experiences of both the peer teachers and the undergraduates enrolled in peer-assisted courses.

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DOES CONGRUENCE BETWEEN ADVISORS' ACADEMIC ADVISING STYLE AND STUDENTS' IDEAL ADVISING STYLE HAVE AN EFFECT ON STUDENT SATISFACTION?

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Abstract

Academic advising in a southern land-grant college of agriculture was evaluated as part of an integrated approach to improving student retention. Undergraduate students (n = 429) were surveyed to determine the style of advising (prescriptive or developmental) used by their current advisor, the students' ideal advising style (prescriptive or developmental), and their level of satisfaction with advising. A majority of students (79.8%) identified their current academic advisor as using a developmental advising style. Nearly all (95.5%) respondents held developmental advising as their ideal advising style. There were significant differences ($p < .0001$) in satisfaction with advising when students were grouped by actual and ideal advising styles. Students with developmental advisors and a preference for developmental advising (77.9%) had a significantly ($p \leq .05$) higher level of satisfaction than students with prescriptive advisors and a preference for developmental advising. Students experiencing congruence between their current advisor's style and their ideal advising style had a significantly ($p < .0001$) higher level of satisfaction with advising than did students experiencing incongruence. The effect size for congruence (or incongruence) on satisfaction was large (Cohen's d = 1.15). These results indicate that student satisfaction with advising could be enhanced by activities encouraging more advisors to adopt the developmental advising style.

Introduction

According to Addleman (1999, p.1), "Degree completion is the true bottom line for college administrators, state legislators, parents, and, most importantly, students." A logical consequence of this statement is that student retention and graduation must be a priority goal for colleges and universities.

The University of Arkansas has a 6-year graduation rate of 56% (Office of Institutional Research, 2007). Increasing the 6-year graduation rate to 66% by 2010 is a top priority for both the university and the college of agriculture (White, 2006; Weidemann, 2007). According to public comments by the chancellor of this university (White, 2006):

> We are not graduating first time, full time, degree seeking students at rates commensurate with their academic abilities. The prediction model used by *U.S. News* [sic] indicates we should be graduating 65% of our students. Independent of *U.S. News* [sic] our prediction model calls for the same rate. (¶ 30)

The American Association for Agricultural Education (AAAE) recognizes and supports the goal of increasing retention and graduation of undergraduate agriculture students. According to AAAE's *National Research Agenda* (Osborne, 2007), a research priority area is to, "Improve the

success of students enrolled in [university] agricultural and life sciences academic . . . programs" (p. 7). The importance of this priority is validated by projections (Goecker, et al., 2005) that the food, agricultural, and natural resources sector of the US economy will experience a 5.2% annual shortage of new college graduates between 2005 and 2010.

Academic advising plays an important role in student retention (Bailey, Bauman, and Lata, 1998; Lau, 2003; Myers and Dyer, 2005; Pascerella and Terenzini, 2005; Tinto, 1993). According to Light (2001), "Good advising may be the single most underestimated characteristic of a successful college experience" (p. 81). Student satisfaction with academic advising is related to overall student satisfaction and retention (Corts, et al., 2000). Given the important role of academic advising in student retention, serious efforts to improve retention should be grounded in an evaluation of student perceptions, desires, and satisfaction with academic advising.

Theoretical Framework

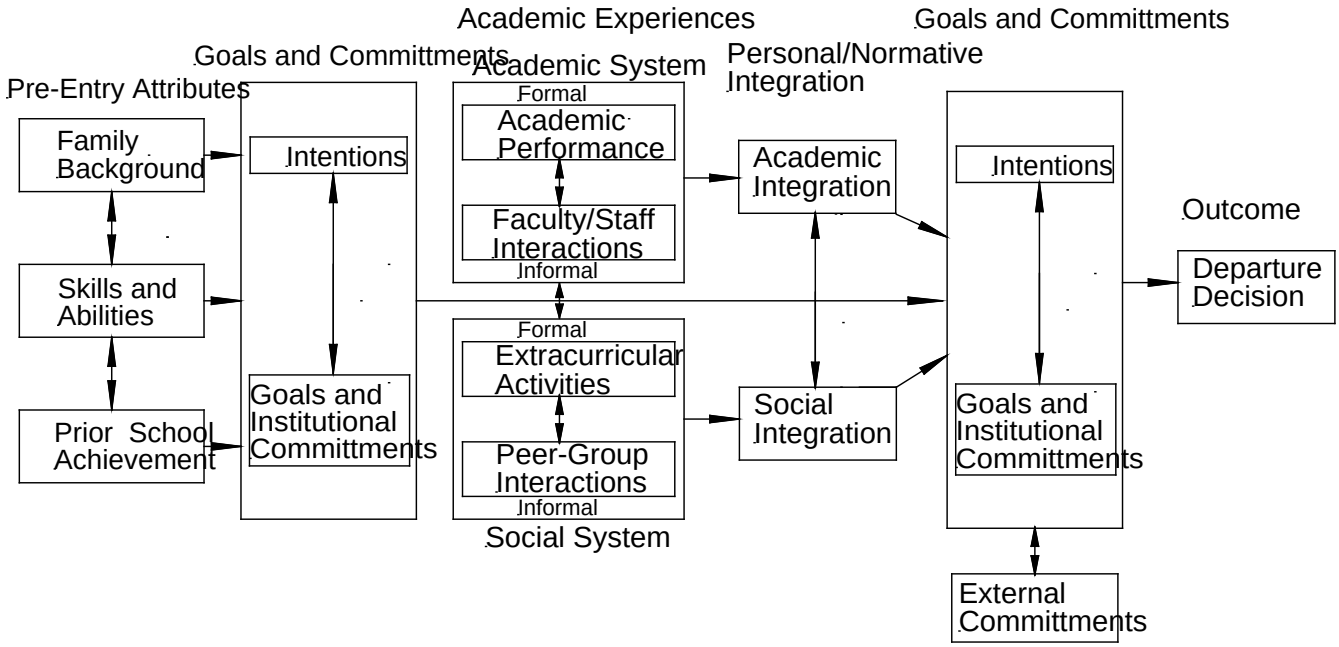
When students graduate from a college or university, it has a positive impact on the graduates, the institution, and society (Tinto, 2004). Graduates develop greater cognitive skills and higher levels of subject matter knowledge (Pascerella and Terenzina, 2005) and qualify for more desirable, higher paying careers (DeBerard, Spielmans & Julka, 2004; Donhardt, 2004). Institutions with higher retention and graduation rates are more efficient and enjoy greater levels of alumni, public, and governmental support (Lau, 2003). Finally, society benefits from a more highly educated citizenry through enhanced public discourse (Cantor, 2004), higher rates of civic participation (Bradburn, Nevill, and Cataldi, 2006), and higher tax receipts (Day and Newburger, 2002). Drawing on data from the Institute for Higher Education Policy, Tinto (2004) concluded:

> People with a college education are much more likely to participate effectively in the governance of the nation, contribute their time and money to community service, consume fewer public services, and commit fewer crimes. They also contribute more to economic growth and productivity helping to create a larger economic pie for all to share. (p. 7)

Students who attend college but do not graduate fail to realize the same level of economic benefits as do graduates. The US Census Bureau (Day and Newburger, 2002) estimated the lifetime earnings of a worker with some college but no degree to be 25% higher than a worker with only a high school education. The estimated lifetime earnings of a worker with a bachelor's degree were 40% higher than for a worker with some college but no degree. According to Tinto (2004), "Does entry in college matter? Yes! **But finishing college and earning a bachelor's degree matters even more** [bold in original]**!**" (p. 7).

Student Attrition and Academic Advising

Tinto (1975, 1993) developed a widely accepted model of student attrition from higher education. According to this model (Figure 1), student attrition is affected by five primary factors: (a) pre-entry attributes; (b) initial and subsequent academic goals and level of commitment to the institution; (c) academic and social experiences at the institution; (d) academic and social integration; and (e) external commitments. Tinto's model posits that



students' institutional experiences affect their level of academic and social integration within the university community, either strengthening or weakening their initial academic goals and commitment to a particular institution. The strength of these intentions and goals, in concert with students' external commitments, determine whether students will depart the institution or persist to degree completion.

Figure 1. Tinto's (1975) model of student attrition. From "A conceptual framework for the causes of student attrition" by J. Gossett, 1989, ERIC Document Reproduction Service No. ED310819.

Hermanowicz (2006) summarized Tinto's model of student attrition by stating:

> Students bring to college sets of traits (e.g., race/ethnicity, gender, achievement, socioeconomic status) that influence their levels of commitment to college. The traits with which students enter and their initial college commitment in turn influence the extent to which they become integrated in a school's academic and social communities. Academic and social integration, therefore, stand as master concepts behind the theory. (p. 22)

Daller (1997) further noted that:

> Once students matriculate, experiences with faculty, students, and staff occur within the academic and social systems of the institution. If the experiences are positive, then student goals and institutional commitment are strengthened. If the experiences are negative, and the student is not properly integrated into the institutional setting, the student is more likely to withdraw. (p. 11)

Academic advising is intended to enhance students' academic and social integration into the institution (Braxton and McClendon, 2001; Daller, 1997; Myers and Dyer, 2005). Effective academic advising has been shown to be an important institutional factor influencing student retention (Beal and Noel, 1980; Daller, 1997; and Tinto (2002). Metzner (1989) found that high-quality academic advising had a significant but indirect effect on retention through increased student satisfaction, higher grades, and a decreased intent to leave the institution.

Student Satisfaction with Advising

Low (2000) concluded that successful institutions share three basic attributes: "they focus on the needs of their students, they continually improve the quality of the educational experience, and they use student satisfaction data to shape their future directions" (p. 2). Student satisfaction measures how effectively campuses deliver what students expect, need, and want. When institutions meet or exceed student expectations, higher student satisfaction and retention are the result (Low, 2000).

Low (2000) and Light (2001) indicated that student satisfaction with academic advising is an important part of a successful college experience. Bailey, et al. (1998) found that non-persisting students in the 14 campus Pennsylvania State University System had a significantly lower level of satisfaction with academic advising than did persisting students.

Noel-Levitz (2006), conducted a nationwide survey of student satisfaction involving 226,423 undergraduates enrolled in 425 US colleges and universities. The researchers found that, next to quality of instruction, academic advising "is consistently the next-most-important area of the college experience to students . . . ahead of registration, campus safety, and support services, to name just a few" (p. 3). Noel-Levitz (2006) also found that while 73.7% of respondents were satisfied with their academic advisor's knowledge of degree requirements, only 67.2% were satisfied with their advisor's concern about their success as individuals and only 59.9% were satisfied with the degree to which their advisor helped them to set goals.

Student satisfaction with academic advising is related to overall student satisfaction and retention (Corts, et al., 2000). Given the important role of academic advising in student retention, serious efforts to improve retention should be grounded in an evaluation of student perceptions, desires, and satisfaction with academic advising.

Developmental versus Prescriptive Academic Advising

Crookston (1972) conceptualized academic advising as a form of teaching and described two styles of academic advising: developmental and prescriptive. Developmental advising is based on a personal relationship between the student and advisor, and integrates academic, career, and

personal goals into advisement, rather than having a sole focus on academic goals (Jordan, 2000). Ender, Winston, and Miller (1984) defined developmental academic advising as:

> A systematic process based on a close student-advisor relationship intended to aid students in achieving educational, career, and personal goals through the utilization of the full range of institutional and community resources. It both stimulates and supports students in their quest for an enriched quality of life. Developmental academic advising relationships focus on identifying and accomplishing life goals, acquiring skills and attitudes that promote intellectual and personal growth, and sharing concerns for each other and for the academic community (p. 19).

Developmental advisors help students with issues related personal growth. They stimulate student growth by questioning students about their goals and progress, as well as by listening to what students say and how they say it (Jordan, 2000). Developmental advisors emphasize positive strengths, abilities, and skills of students rather than focus on limitations or failures (Jordan, 2000). Developmentally trained advisors encourage self-reliance in students by helping students set realistic goals and make informed, responsible decisions (Jordan, 2000). Because developmental advising focuses on the entire person, developmental advisors should be more effective in fostering students' academic and social integration within the institution.

Prescriptive advising is impersonal and authority-based, answering only specific questions and not taking individual development into consideration (Jordan, 2000). According to Crookston (1972)

> The relationship is obviously based on authority; the advisor is the doctor and the student the patient. The patient comes in with some ailment. The doctor makes a diagnosis, prescribes something, or gives advice. Therefore, if the student follows the advice, the problem will be solved and all is well!" (pp. 12-13)

Novice advisors often use a prescriptive advising style (Jordan, 2000). Since many students expect this type of advising (Crookston, 1972), many advisors never transition to a more developmental advising style. While prescriptive advising may be an efficient method of scheduling student courses, prescriptive advisors are likely to be less effective in fostering students' academic and social integration within the institution.

Purpose and Objectives

The purpose of this study was to examine undergraduate academic advising in the Bumpers College of Agricultural, Food and Life Sciences. Specific objectives were to determine:

1. Students' perceptions of their current advisor's academic advising style (prescriptive or developmental) and their ideal advisor's academic advising style (prescriptive or developmental);

2. Students' level of satisfaction with academic advising; and

3. If significant ($p \leq .05$) differences existed in undergraduate agriculture students' level of satisfaction with academic advising based on congruence (or incongruence) between their advisor's academic advising style (prescriptive or developmental) and students' preferred academic advising style (prescriptive or developmental).

Procedures

The population for this study consisted of all undergraduate students enrolled in the Bumpers College of Agricultural, Food and Life Sciences during the spring 2006 semester (N=1187). A list of all undergraduate classes in the Bumpers College was obtained from the Dean's office. A sample of 21 classes was selected in order to have a representative sample of academic departments and course levels (freshman, sophomore, junior, and senior). Following university IRB approval, arrangements were made to with each instructor for the researcher to administer the survey during a specified class period. A written statement concerning confidentiality and the voluntary nature of student participation was read to each class prior to distribution of the instruments. Students were instructed not to complete the instrument if they had already completed it in another class. Usable responses were provided by 429 students.

A modified version of the Academic Advising Inventory (AAI) (Winston and Sandor, 2002) was used to assess advising in the Bumpers College. Part I assessed student perceptions of their current academic advising situation using 14 paired items. Each item (Figure 1) consisted of two statements (representing the prescriptive and developmental advising styles) and a rating scale. For each item, students first selected the statement that most nearly represented their current advisor's advising style (prescriptive or developmental) and then rated the level of truth of the statement. The placement of the statements (left or right side) was varied from item to item in order to prevent response set.

1. My advisor is interested in helping me learn how to find out about courses and programs for myself.

   My advisor tells me what I need to know about academic courses and programs.

A---------	**B---------**	**C---------**	**D**	**OR**	**E----------**	**F---------**	**G---------H**
Very True		Slightly True			Slightly True		Very True

Figure 1. Sample item from the Academic Advising Inventory (Winston and Sandor, 2002).

According to Winston and Sandor (2002), Part I of the AAI "describes the nature of the advising relationship . . . . It represents a continuum between the two contrasting behavioral styles and attitudes – prescriptive and developmental – as perceived by students" (p. 11). Scores on Part I were summed with the possible range of scores being 14 to 118. Summed scores of 57 or higher represented the developmental advising style, while scores of 14 to 56 represented the prescriptive advising style (Winston and Sandor, 2002).

Part III of the AAI (Winston and Sandor, 2002) contained five items (on a 4-point Likert-type scale) which were summed to measure student satisfaction with academic advising. Part IV consisted of the same 14 items and format as in Part I, except that respondents were instructed to rate their preferred advising style. Part IV was summed and interpreted in the same manner as Part I (Winston and Sandor, 2002). Part V collected selected demographic information from the respondents. Part II of the AAI (Winston and Sandor, 2002) was not used in this study.
The AAI (Winston and Sandor, 2002) is based on Crookston's (1972) theory of developmental advising. Winston and Sandor (2002) validated the AAI by administering it to 53 students in a special developmental advising program and 74 students receiving advising primarily limited to course selection and scheduling. Consistent with theory (Crookston, 1972), students in the developmental advising group scored significantly ($p < .001$) higher on Part I of the AAI which assesses student perceptions of the advising relationship (prescriptive or developmental). Winston and Sandor (2002) also reported a significant positive correlation between Part I (prescriptive or developmental advising) and Part III (satisfaction with advising) of the AAI. This was also consistent with Crookston's (1972) advising theory.

For this study, coefficient alpha reliability estimates of .80 and .79 were found for current advising style (Part I) and preferred advising style (Part IV), respectively. The satisfaction with advising scale (Part III) had a coefficient alpha reliability of .89. The reliability of Part V (demographics) was not assessed since, according to Salant and Dillman (1994), responses to non-sensitive demographic items are subject to "very little measurement error" (p. 87).

Findings

A total of 429 instruments were completed. A majority of respondents were female (64.8%) and white/Caucasian (87.6%). The respondents were fairly evenly distributed among freshmen (24.7%), sophomores (23.0%), juniors (24.4%), and seniors (22.5%). Respondents represented all 15 academic majors in the Bumpers College.

As shown in Table 1, 79.8% of respondents perceived the advising style used by their current advisor as developmental, as determined by Part I of the AAI (Winston and Sandor, 2002). According to the results of a t-test for unequal variances, the mean scores on Part I of the AAI were significantly different for advisors classified as prescriptive versus developmental (as perceived by students), $t(251) = 26.67$; $p < .0001$; Cohen's $d = 2.34$. According to Cohen (1988), the effect size (Cohen's $d = 2.35$) represents a large effect. These results support the theoretical constructs (Crookston, 1972) that serve as the basis for the AAI (Winston and Endor, 2002) and provide evidence of two distinct advising styles as perceived by students.

Table 1

Academic advising style of current advisor as perceived by respondents.

Current advisor's style	*n*	*%*	*Mean*	*SD*	Minimum	Maximum
Prescriptive	70	20.2	48.7	6.0	25	56
Developmental	276	79.9	77.4	13.3	57	112

Note. Only respondents (n = 346) completing all 14 items in Part I of the AAI were included in this analysis.

Students expressed a strong preference for developmental advising, with 95.5% of respondents indicating their ideal advisor would use the developmental advising style, as determined by Part IV of the AAI (Table 2). According to the results of a t-test for unequal variances, the mean scores on Part IV of the AAI were significantly different between prescriptive and developmental ideal advisors, $t(33.4) = 25.26$; $p < .0001$; Cohen's $d = 2.43$. According to Cohen (1988), the effect size (Cohen's $d = 2.43$) represents a large effect. Again, these results support the theoretical constructs (Crookston, 1972) that serve as the basis for the AAI (Winston and Endor, 2002) and provide evidence of two distinct ideal advising styles as perceived by students.

Table 2

Academic advising style of ideal advisor as perceived by respondents.

Ideal advisor's style	*n*	*%*	*Mean*	*SD*	Minimum	Maximum
Prescriptive	17	4.5	51.9	4.8	37	56
Developmental	360	95.5	87.2	14.8	57	112

Note. Only respondents (n = 377) completing all 14 items in Part IV of the AAI were included in this analysis.

Figure 2 presents a quadrant analysis of respondents' current academic advisor's style and their ideal academic advising style. Nearly 80% (79.7 %) of students experienced congruence between their current advisor's academic advising style and their ideal advising style. The largest group of students (77.9%) had a developmental advisor and held developmental advising as their ideal style. An additional 1.8% of students had a prescriptive advisor and held prescriptive advising as their ideal style. Approximately 20% of students did not experience congruence between current and ideal advising styles. A majority of these students (90.0%) had a prescriptive advisor but held developmental advising as their ideal style.

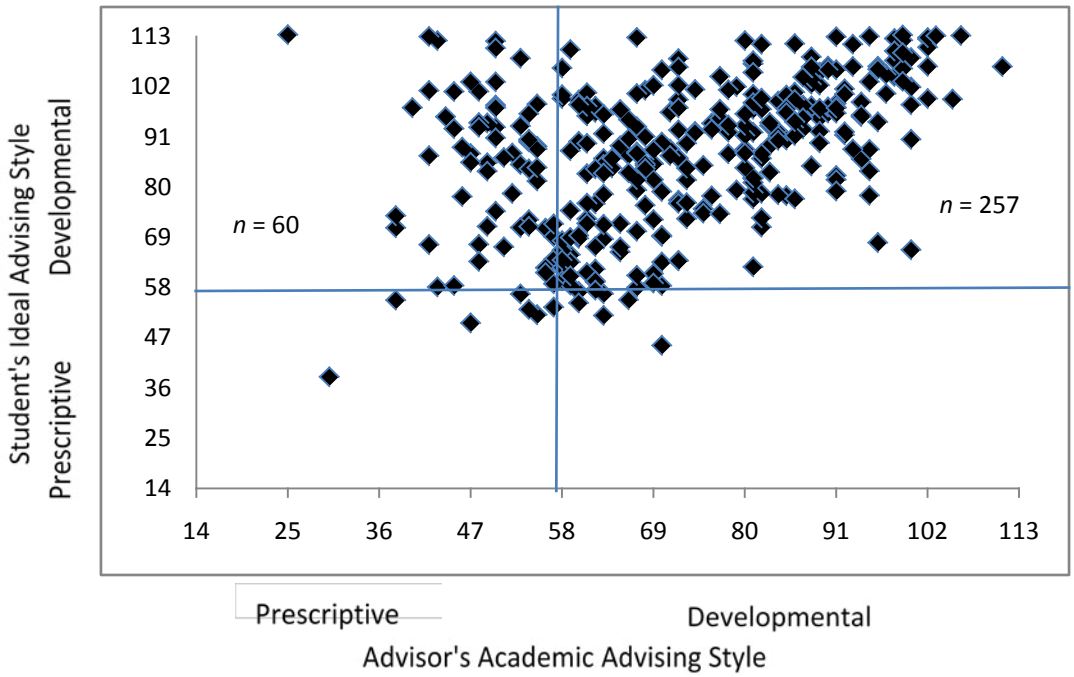


Figure 2. Quadrant analysis of advisor's academic advising style and student's ideal academic advising style. Only respondents (n = 330) completing all items in Parts I and IV of the AAI were included in this analysis.

Overall the respondents were satisfied with the academic advising they received in the Bumpers College. The mean level of student satisfaction with advising was 3.02 (SD =0.71) on a 4-point Likert-type scale (1 = low satisfaction and 4 = high satisfaction). The distribution of satisfaction scores was negatively skewed (skew = -0.70) with a median of 3.0 and an interquartile range of 1.0.

The results of one-way analysis of variance (ANOVA) indicated that there was a significant difference in satisfaction with academic advising when students were grouped by current advisor's style and ideal advising style, $F(3, 226) = 22.47$; $p < .0001$; $R^2 = .17$.

According to the results of post-hoc analysis (Table 3), students who had a developmental advisor and held developmental advising as the ideal style had a significantly higher level of satisfaction than students with a prescriptive advisor who held developmental advising as their ideal type. There were no other significant differences in satisfaction with advising by current and ideal advisor groupings (developmental-prescriptive or prescriptive-prescriptive); however this result must be interpreted in light of the small cell sizes.

Table 3
Current advisor's academic advising style, student's ideal advising style, and level of satisfaction with advising.

Advisor's advising style	Ideal advising style	n	%	Level of satisfaction Mean	SD
Developmental	Developmental	257	77.9	3.21a	0.65
Developmental	Prescriptive	7	2.1	2.94ab	0.65
Prescriptive	Prescriptive	6	1.8	2.84ab	0.27
Prescriptive	Developmental	60	18.2	2.48b	0.58

Note. Level of satisfaction was measured on a 4-point scale (1 = *low satisfaction*, 4 = *high* satisfaction). Only respondents (n = 330) completing all items in Parts I, III, and IV of the AAI were included in this analysis. Means that do not share a letter are significantly different ($p \leq .05$) by the Scheffe post-hoc test.

To further examine the relationship between satisfaction with advising and advising styles, students experiencing congruence ($n = 263$) between current and ideal advising styles were compared with students experiencing incongruence ($n = 67$). Mean satisfaction for the congruent group was significantly higher ($M = 3.21$; $SD = 0.65$) than for the incongruent group (M = 2.48; $SD = 0.59$), $t(315) = 8.02$; $p < .0001$; Cohen's $d = 1.15$. According to Cohen (1988) this represents a large effect.

Conclusions and Recommendations

A majority (79.8%) of students perceived their current academic advisor as being a developmental advisor. This indicates that these students perceive their relationship with their advisor as being more than simply a matter of course scheduling. Developmental advisors develop personal relationships with students and integrate academic, career, and personal goals into the advising process (Jordan, 2000). Such relationships have been found to be related to enhanced student retention and degree completion (Daller, 1997).

Approximately one-fifth (20.2%) of students perceived their current academic advisor as being a prescriptive advisor. Prescriptive advising is fairly impersonal and authoritarian in nature with a primary focus on academic requirements and course scheduling (Crookston, 1972). Students with prescriptive advisors may not have the same opportunities to become integrated into the academic and social communities of the university as do students with developmental advisors (Braxton and McClendon, 2001; Myers and Dyer, 2005). According to Tinto's (1993) model of student attrition, such students are less likely to persist to graduation.

Nearly all (95.5%) students indicated that that their ideal academic advisor would be a developmental advisor. This indicates that students want a personal relationship with advisors and seek more from the advising relationship than simply information on course selection and

scheduling. This supports Light's (2001) contention that the quality of the advising relationship is one of the most important factors in the college experience.

There was a high level of congruence (79.7%) between students' current advisor's style and their ideal academic advising style. More than three-fourths (77.9%) of students both perceived their current academic advisor as being a developmental advisor and held developmental advising as their ideal style. However, approximately 20% of students experienced incongruence between actual and ideal advising styles. This was primarily accounted for by those students (17.6%) with prescriptive advisors who held developmental advising as their ideal style.

Overall students were satisfied (M = 3.02) with the academic advising they received in the Bumpers College of Agricultural, food and Life Sciences. However, students with prescriptive advisors who held developmental advising as their ideal style were significantly less satisfied (M = 2.48) than students with developmental advising as both their current and ideal advising style (M = 3.21).

Students who experienced congruence between current and ideal advising styles had a significantly higher level of satisfaction (M = 3.21) than those experiencing incongruence between actual and ideal advising styles (M = 2.48). The effect size (d = 1.15) for congruence or incongruence between actual and ideal advising styles and satisfaction with advising was large (Cohen, 1988).

College and departmental administrators should encourage and reward developmental advisors. Prescriptive advisors should be provided with assistance, encouragement, and incentives to adopt a more developmental advising style. The results of this study indicate that increasing the percentage of developmental advisors should lead to a higher level of student satisfaction with academic advising. Given the theoretical (Tinto, 1993) and empirical (Beal and Noel, 1980; Daller, 1997) link between student satisfaction with advising and retention, this may lead to improved student retention in the Bumpers College.

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LEVELS OF STUDENT DEVELOPMENT IN THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES AT THE UNIVERSITY OF FLORIDA

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The purpose of this study was to examine student development of undergraduates in the College of Agricultural and Life Science at the University of Florida. This study was administered to undergraduates in three purposely selected classes; AEE 2014-Economics and you, AEE-Principles of agribusiness, and FOS 3042-Introduction to food science (n=451). The participants completed form 2.99 of the Student Developmental Task and Lifestyle Assessment (SDTLA), which measured levels of student development on the Establishing and Clarifying Purpose Task of the overall SDTLA. Dependent variables in the study were educational involvement, career planning, lifestyle planning, and cultural participation subtasks. Independent variables included gender, ethnicity, international student classification, current residence, employment, current number of credit hours, leadership positions held, academic standing, number of semesters attended college, and involvement in extracurricular activities. Participants in this study reported student development scores that were very similar to the national normative sample as measured by the Student Developmental Task and Lifestyle Assessment. Participants also reported they were familiar with jobs in their career area, had some experience in their career area, had clear priorities for establishing a family, were involved in lifestyle planning activities, had become more culturally sophisticated in college, and took the initiative to arrange conferences with an academic advisor. However, participants had not formed a personal relationship with faculty members, made a firm decision about an academic major, or joined a student organization related to their career area.

Introduction

Two fundamental beliefs of education are that people can change and that educators and educational environments can affect change (Winston, Miller, & Cooper, 1987). Observations of college students from entry through graduation confirm that students do change as a direct result of the higher education experience (Astin, 1977; Feldman & Newcomb, 1969; Pace, 1979). The main purpose of higher education should be to encourage intentional psychosocial developmental changes in students (Chickering, 1981).

There is considerably more to higher education than academic and intellectual learning alone (Hazen Foundation, 1968). Students' interactions with teachers, encounters with college leaders, involvement in friendship groups, acquisition of values from the student culture, and exposure to climates of flexibility or rigidity that permeate the college environments have an immense impact on the evolution of students' self and world views, on their confidence and altruism, and on their achievement of personal identity and mature intimacy. By the very fact that colleges intend to inform students' minds, these institutions become intimately involved in the development of the whole person, of which intellectual faculties are but a part (Hazen Foundation, 1968; Pascarella & Terenzini, 1991).

As Chickering (1981) noted, every college and university in the country is in the business of shaping human lives in ways that extend well beyond academic learning. The key issue is not

so much whether the higher education experience promotes growth and development beyond the intellectual domain alone, for there is consensus that it does, but rather what forms that development takes and how it can be identified and assessed. “The overarching educational purpose of our colleges and universities should be to encourage and enable intentional developmental change in students” (Chickering & Havinghurst, 1982, p. 2).

“How students turn out at the end of their college experiences, the degree of their success from their own point of view, or that of the college, depends both on what they were like at the time of admission and upon the influences of college” (Sanford, 1962, p. 42). The college student in developmental terms is a person who is engaged in a variety of age-related developmental tasks (Strange, 1999). The impact of college on students does not result from a single experience but involves the “cumulative result of a set of interrelated and mutually supporting experiences, in class and out, sustained over an extended period of time” (Pascarella & Terenzini, 1991, p. 31). Chickering (1974) noted that the student culture either amplifies or attenuates the impact of curriculum, teaching, and evaluations, residence hall arrangements, and student faculty relationships.

Research has indicated that the college years are a critical period for students’ personal, social, and professional growth (Astin, 1985; Astin, 1993). Astin (1985) suggested that student learning and personal development are directly proportional to the quality and the quantity of student involvement in the process of learning, including participation in leadership experiences and activities. The positive influence of campus-wide interactions on students’ attitudes, interests, and values has been documented for decades (Feldman & Newcomb, 1969; Pascarella & Terenzini, 2005).

Theoretical/Conceptual Framework

Psychosocial theorists suggest that an individual develops through a series of stages in the life cycle. Each developmental stage or phase is created by the convergence of a particular growth phase and certain tasks, such as learning certain attitudes and specific skills which must be mastered to successfully manage that particular phase. In more general terms, psychosocial theorists suggest that development follows a chronological sequence. At different times in a person’s life, different aspects of their personality will emerge as a concern that must be addressed. From a student development viewpoint, these aspects would include age of the student; decisions, concerns, and needs of primary concern; and the skills and attitudes that need to be developed to make decisions and perform tasks (Knefelkamp, Widick, & Parker, 1978).

Chickering is recognized as one of the most prominent psychosocial theorists. Pascarella and Terenzini (1991) noted that no other theorist has had a greater influence on the study of college student development. His seminal work, *Education and Identity* (Chickering, 1969), provided the theory upon which all other student development theories are based (Pascarella & Terenzini, 1991). Chickering saw the traditional-aged college student as a person in a distinct psychosocial phase defined by the emergence of certain inner capabilities and needs which interact with the demands of a particular college environment (Widick, Parker, and Knefelkamp, 1978a).

Studies have shown that changes occur as students' progress through their college career (Brown, 1972; Winston & Miller, 1987). Not only does change occur in students' academic and social development, but also in their psychosocial development. Chickering's theory posits that students must move through seven vectors of development to establish self-identity. He maintained that the developmental age spanning the years from 18 to 25 must be studied separately from other developmental stages because the tasks of the period are related to, but substantially different from, those of both adolescence and adulthood. Calling this developmental stage "the young adult," Chickering (1969, p. 8) postulated seven major developmental tasks, or developmental vectors. In a revision of *Education and Identity* (Chickering & Reisser, 1993, p. 43), the authors proposed the following revised set of developmental vectors.

- *Developing Competence* - Competence involves the development of intellectual competence, physical and manual skills, and social and interpersonal competence. Competence translates into having "the confidence that one can cope with what comes and achieve goals successfully" (Chickering & Reisser, 1993, p. 53; Winston, Miller, & Cooper, 1999).

- *Managing Emotions* - The student's first task along this vector is to become aware of feelings and to acknowledge and trust them to recognize that they provide information relevant to contemplated behavior or to decisions about future plans. As a larger range of feelings is fully expressed, new and more useful patterns of expression and control can be achieved (Winston, Miller, & Cooper, 1999).

- *Moving through Autonomy toward Interdependence* - Mature independence requires both emotional and instrumental independence and the recognition of one's interdependencies. To be emotionally independent is to be free of continual and pressing needs for reassurance, affection, or approval. Instrumental independence has two components: the ability to carry on activities and to cope with problems without seeking help, and the ability to be mobile in relation to one's needs. Interdependency is recognizing that loving and being loved are complementary, or that one cannot receive benefits of a social structure without contributing to it. "Developing autonomy culminates in the recognition that one cannot operate in a vacuum and that greater autonomy enables healthier forms of interdependence" (Chickering & Reisser, 1993, p. 47; Winston, Miller, & Cooper, 1999).

- *Developing Mature Interpersonal Relationships* - Relationships should shift toward greater trust, independence, and individuality and become less anxious, defensive, and burdened by inappropriate past reactions. Mature relationships are more friendly, spontaneous, warm, and respectful. Maturity is reflective of "long-lasting relationships that endure through crises, distance, and separation" (Chickering & Reisser, 1993, p. 48). Developing greater tolerance for differences is a significant aspect of this task (Winston, Miller, & Cooper, 1999).

- *Establishing Identity* - Identity is an advanced vector that reflects confidence in one's ability to maintain inner sameness and continuity. Further, identity involves clarification of conceptions concerning physical needs, characteristics, and personal appearances; clarification of sexual identification and of sex appropriate roles and behaviors; and a sense of self-esteem, personal stability, and integration (Chickering & Reisser, 1993; Winston, Miller, & Cooper, 1999).

- *Developing Purpose* - Development of purpose requires formulating plans and priorities that integrate avocational and recreational interests, vocational plans, and life-style considerations. "Developing purpose entails an increasing ability to be intentional, to assess interests and options, to clarify goals, to make plans for action" (Chickering & Reisser, 1993, p. 47; Winston, Miller, & Cooper, 1999).

- *Developing Integrity* - Developing integrity involves humanizing and personalizing values and developing congruent values. Humanizing of values describes the shift from a literal belief in the absoluteness of rules to a more relative view. Personalizing of values occurs as values are first examined and then selected by an individual. The development of congruence is the achievement of behavior consistent with the personalized values held (Chickering & Reisser, 1993; Winston, Miller, & Cooper, 1999).

Chickering's seven vectors enable student development professionals to understand how students are dealing with the uncertainty of adulthood. In addition, the seven vectors also enable student personnel in higher education to better understand their roles as student development professionals by specifying a series of interrelated stages college students are seeking to resolve (Flowers, 2002). Chickering's theory provides researchers and student affairs practitioners with some very useful descriptors of the emotional and psychological transformation students might potentially undergo in college (Reisser, 1995; Thomas & Chickering, 1984).

Although Chickering and Reisser hesitated to depict development in their model as proceeding from one stage to another, they did propose a sequential model suggesting that earlier vectors form a foundation for later vectors. They noted that early college experiences are likely to move students along the first four vectors, which in turn helps them develop their identity. After developing their identity (vector 5), students are more likely and able to develop purpose and integrity (Foubert, Nixon, Shamim-Sisson, & Barnes, 2005). Student development occurs sequentially along these seven stages in college (Flowers, 2002).

The seven vectors can be viewed as a series of developmental tasks, a source of concern, and a set of outcomes. The vectors in psychosocial terms specify the nature and range of those tasks. The vectors also define the central concerns of the student and the tasks which will confront them and become sources of worry. Finally, each vector outlines changes in self-awareness, attitudes, and/or skills which are manifestations of successful completion of that task or vector (Widick et al., 1978a). According to Chickering and Reisser (1993), these seven areas represent the common core of the major foundations of non-intellective development during the college years variously termed growth trends, developmental tasks, stages of development, personal development, needs and problems areas, or student typologies. Their theory "assumes

that emotional, interpersonal, and ethical development deserve equal billing with intellectual development" (p. 39).

Research has validated that college students develop along Chickering and Reisser's (1993) vectors during the college experience (Cooper, Healy, & Simpson, 1994; Martin, 2000; Straub, 1987). Similarly, Foubert et al. (2005) found that college students advanced in their development throughout their college experience in the areas of developing purpose, mature interpersonal relationships, academic autonomy, and tolerance, supporting the validity of Chickering and Reisser's (1993) assertion that development along these vectors occurs during college.

Primarily, Chickering's theory points out that the student population will always remain diverse across developmental lines. In other words, at any given time, the student body at a college will contain students from all seven of Chickering's vectors. Thus, those "administrators who focus on student leadership development will never be able to focus all of their efforts on just one aspect of identity development" (Widick et al., 1978a, p. 21). For this reason, student development programs must remain flexible and diverse in order to accommodate students from all levels of development.

Purpose and Objectives

A lack of knowledge and information existed about the developmental needs of students in the College of Agricultural and Life Sciences at the University of Florida. This lack of knowledge extended beyond the boundaries of the classroom and into other areas, including involvement, career and lifestyle planning, and cultural participation.

The purpose of this research was to examine student development of undergraduates in the College of Agricultural and Life Sciences at the University of Florida. The objectives of the study were to:

1. Assess levels of student development of undergraduates in a college of agricultural and life sciences.
2. Examine the relationship between demographic characteristics and the levels of student development of undergraduates in a selected college of agricultural and life sciences.

Procedures

This study utilized a descriptive survey research design. Validity threats inherent in this research design were addressed in a number of ways. Although a random sample of students was not used, intact classes were selected that represented a broad sample of undergraduates in the College of Agricultural and Life Sciences in proportion to underclassmen and upperclassmen enrolled in the college. The questionnaire was administered in the classroom setting, and once participants finished the questionnaire, they were then allowed to leave the classroom. Due to the nature of the study and method of administration, history, maturation, testing, mortality, and statistical regression were not considered significant validity threats in the study (Ary et al., 2002).

The population for the study included all undergraduate students enrolled in the College of Agricultural and Life Sciences (CALS) at the University of Florida for the spring 2007

semester (N = 3,274). The class breakdown was as follows: freshmen - 325, sophomores - 427, juniors - 1,224, and seniors - 1,298. Underclassmen comprised of 23% (752) of the undergraduate population, while upperclassmen comprised of 77% (2,422) of the undergraduate population. The researcher gathered data on eleven introductory courses in CALS. Population data and class ratios were then analyzed, and a combination of classes was selected that mirrored the upperclassmen and underclassmen percentages in CALS. In total, 451 students were enrolled in the three selected classes, including 94 (20.8%) underclassmen and 298 (66.1%) upperclassmen. The classes included:

- AEB 2014-Economic Issues Food and You (118 students; 36.4% underclassmen and 54.2% upperclassmen
- AEB 3133-Principles of Agribusiness Management (116 students; 9% underclassmen and 87.9% upperclassmen
- FOS 3042-Introduction to Food Science (217 students; 18.4% underclassmen and 60.8% upperclassmen.

The Student Developmental Task and Lifestyle Assessment (SDTLA) was used to gather data. The SDTLA is a revision of the Student Developmental Task and Lifestyle Inventory (SDTLI) (Winston, Miller, & Price, 1987) and is grounded in the work of Chickering. The phenomena with which the SDTLA is concerned with, within the context of higher education, are the changes produced in individuals as a result of accomplishing a developmental task or having addressed important life events. The SDTLA represents a sample of behavior, including feelings and attitudes that are familiar to students who have satisfactorily achieved developmental tasks common to young adult college students between the ages of 17 and 25. The samples of behavior were chosen because they represent larger behavioral domains (Winston et al., 1999). The SDTLA is specifically designed to measure the developmental tasks of college students and consists of both developmental tasks and scales. A developmental task is defined as an interrelated set of behaviors and attitudes that the culture of colleges and universities specifies should be exhibited at approximately the same time by a given age cohort in higher education. A subtask is defined as a more specific component or part of a larger developmental task, whereas a scale is the measure of the degree to which students report possessing certain behavioral characteristics, attitudes, or feelings. Like a developmental task or subtask, a scale may not be directly affected by participation in the higher education environment. The SDTLA consists of three developmental tasks: Establishing and Clarifying Purpose, Developing Autonomy, and Developing Mature Interpersonal Relationships (Winston et al., 1999). Based on discussions with the Dean and Director of Student Development of CALS, the Establishing and Clarifying Purpose Task was selected for use in this study. Students who succeed with this task have well-defined educational goals and plans and are active, self-directed learners. They have also developed knowledge about themselves and future employment, created appropriate career plans, and taken steps toward realizing their career goals. Successful students in this task have established a personal direction in their lives and developed plans for their futures that take into account personal, ethical, and religious values; future family plans; and vocational and educational objectives. Finally, these students exhibit a wide range of cultural interests and active participation in both traditional and non-traditional cultural events (Winston et al., 1999). This task was then further delineated into the following subtasks: educational involvement, career planning, lifestyle planning, and cultural participation.

The SDTLA consists of four forms and 153 items. For the purpose of this research, only Form 2.99 was used, which included 57 items measuring the Establishing and Clarifying Purpose Task (career planning, lifestyle planning, educational involvement, and cultural participation subtasks). Form 2.99 normally requires 15 to 20 minutes to complete (Winston et al., 1999). The questions asked on the SDTLA included 47 multiple choice, 10 true and false, five demographic, and five researcher-developed questions. The researcher developed questions asked respondents about extracurricular activities, leadership positions, college enrollment, number of credit hours taken in the spring 2007 semester, and current employment.

As reported by SDTLA developers, pilot test data with nearly 2,000 students enrolled in 32 colleges in the United States and Canada provided reliability (internal consistency) estimates of .62 to .88. Test-retest coefficients ranged from .70 to .89 using three classes of students enrolled at two different institutions (Winston et al., 1999). In the analysis of the instrument as described above, test-retest reliability and internal consistency reliability estimates for the Establishing and Clarifying Purpose Task were .81 and .84, respectively (Winston et al., 1999). Further, the SDTLA was developed from other existing scales that included the *Career Development Inventory* (Super, Thompson, Lindeman, Jordann, & Meyers, 1981), *College Student Experiences* (Pace, 1983), and *Life Skills Development Inventory*, (Picklesimer, 1991). Posthoc internal reliability estimates for the four subtasks and overall task in the current study ranged from .74 to .89.

Whereas the entire SDTLA is available in a web-based format, individual tasks can only be administered in a paper and pencil format. Prior to the collection of the primary data for this survey, the SDTLA was purchased, and additional demographic questions were added. The finalized instrument was then submitted to the University of Florida Institutional Review Board for non-medical projects (IRB-02). Data collection began in April 2007, and procedures were followed using Dillman's tailored design method (Dillman, 2007). Data were collected using a cover letter and consent form outlining the purpose of the study, need for participation, and instructions for completion; a Scantron answer sheet; and the questionnaire. Respondents were given class time to complete and return the survey. The overall response rate of 58.9% (n = 266) was based on class attendance on the particular day that the instrument was administered. A second administration of the SDTLA to students who were absent was not possible, due to the instructors' course schedules. Respondents included 236 students enrolled in CALS; questionnaires from non-CALS students were discarded.

Data were analyzed using descriptive statistical analysis. Student response sheets were sent to Appalachian State University for scoring and analysis. Data were returned in SPSS format to allow for additional descriptive and correlational analysis.

Findings

Objective one focused on assessing the levels of student development in the sample using the SDTLA. Key findings in each of the four subtasks comprising the Establishing and Clarifying Purpose Task are presented in Table 1 below.

Table 1. Percentage of Respondents by Subtask Dimension

Subtask and Key Dimensions	%
Career Planning Subtask	
Know one or more sources that provide information about future employment	72.5
Have a vague or no idea about how to get information on employment prospects	27.6
Have not thought about or explored post-college jobs or careers	35.5
Can name up to one beginning level position in my career field	30.4
Have discussed my career goals with at last two professionals in my career field	52.5
Have a clear picture of what I will face in the job market after graduation	47.9
Have a vague or no idea about my career choice upon graduation	52.1
Have at least a general idea of what I must do to be competitive in the job market	87.7
Have an active plan for gaining practical experience in their career area of interest	40.9
Have little to no experience in my career area or have not yet decided on a career	40.2
Am actively involved in one or more student organizations in my career area	28.9
Have visited a career center of library to obtain career information	39.1
Lifestyle Planning Subtask	
Have a clear understanding of how my personal values will shape my career decisions	38.1
Am confident in my strategies to maximize my strengths an minimize my weaknesses	27.7
Am clear enough about my life five years from now to take steps to realize my dreams	82.0
Have a very clear picture of how my current studies will shape my future	44.4
Have made a clear decision about the role in marriage in my future	81.3
Have clear family priorities and goals	63.8
Systematically develop skills and habits to help me learn after college	83.4
Cultural Participation Subtask	
Always or usually seek to broaden my understanding of culture	58.7
Always or usually seek out opportunities to learn about cultural or artistic forms	37.5
Have become more cultural sophisticated since attending college	79.9
Attend cultural events not required in a course	49.2
Occasionally or frequently participate in the arts for my own benefit	55.3
Educational Involvement Subtask	
Have chosen a major and am confident in that choice	50.0
Have determined all requirements and timelines needed to complete my major	62.7
Have investigated the abilities and background needed to be successful in my major	70.0
Have taken the initiative to schedule conferences with an academic advisor	73.3
Have kept appointments when scheduled by an academic advisor	12.3
Have had a serious conversation about long-term educational objectives with an academic advisor	53.0
Don't know who to talk to about my educational objectives	11.4
Have a mature working relationship with a member of the academic community	54.7
Have formed an enjoyable relationship with my advisor	33.1
Have initiated a serious discussion with a faculty member	45.3
Have tried unsuccessfully to have a serious discussion with a faculty member or was unable to find a faculty member willing to discuss things with me	31.6
Spend my free time working or participating in campus organized activities	40.0
Was involved in a student organization in the last six months	52.5

Standardized t-scores (M = 50, SD = 10) provided by Student Development Associates (Winston et al., 1999) were computed using a normative sample of over 1800 undergraduate students from 42 different universities. Means and standard deviations for each of the subtasks and the overall task were calculated on the data sample. As shown in Table 2, the task and subtask means in this study were very comparable to those of the norm group.

Table 2. Standardized Means and Standard Deviations for the Career Planning, Lifestyle Planning, Cultural Participation, and Educational Involvement Subtasks and Establishing and Clarifying Purpose Task

Subtask and Task	Mean	Standard Deviation	n
Career Planning	50.9	10.0	231
Lifestyle Planning	51.6	9.3	231
Cultural Participation	47.7	10.1	230
Educational Involvement	48.4	10.1	231
Establishing and Clarifying Purpose	49.4	9.2	231

The second study objective was to examine the relationship between selected demographic variables and levels of student development. The data sample was 30.8% male and 69.2% female. With regard to ethnicity, 11.3% were Black, 15.1% Hispanic, 8.7% Asian American or Pacific Islander, and 58.4% Caucasian. The sample was 33.4% underclassmen and 66.6% upperclassmen. About one-fifth (21.2%) of the students lived on campus, and only 7.6% of the respondents indicated that they were international students. Campus leadership positions were held by 32.3% of the respondents, and 69.8% reported that they participated in extracurricular activities. Nearly one-half (48.5%) of the respondents were employed.

Pearson point biserial coefficients were used to examine the relationship between holding a leadership position and student development on the overall Establishing and Clarifying Purpose Task and its four subtasks. Correlation coefficients were interpreted using the convention suggested by Miller (1994). A moderate relationship (r_{pb} =0.315) was found between the overall task and serving in a student leadership position. Low relationships were found between student leadership all four subtasks (see Table 3). Students who held leadership positions in CALS student organizations had a moderate tendency to have higher scores on the overall student development task and a low tendency to have higher scores on each of the four subtasks. As shown in Table 4, underclassmen had a slight tendency to report higher scores on the overall task and the individual subtasks, with the exception of the lifestyle planning task, where no relationship was found. All other relationships between demographic variables and the task and subtasks were negligible.

Table 3. Correlation Between being in a Leadership Position with the Career Planning, Lifestyle Planning, Cultural Participation, and Educational Involvement Subtasks and Establishing and Clarifying Purpose Task

Task or Subtask	r_{pb}
Establishing and Clarifying Purpose Task.	.315
Educational Involvement Subtask.	.280
Cultural Participation Subtask.	.199
Lifestyle Planning Subtask.	.150
Career Planning Subtask.	.266

Table 4. Correlation Between Academic Class Standing and Career Planning, Lifestyle Planning, Cultural Participation, and Educational Involvement Subtasks and Establishing and Clarifying Purpose Task

Task or Subtask	r_{pb}
Establishing and Clarifying Purpose Task.	-.214
Educational Involvement Subtask.	-.208
Cultural Participation Subtask.	-.192
Lifestyle Planning Subtask.	-.071
Career Planning Subtask.	-.163

One-way analysis of variance was calculated to compare differences in levels of student development by ethnic group. Results indicated a significant difference among groups in the career planning subtask (F=2.57, p<.05) and lifestyle planning subtask (F=3.39, p<.05). Tukey HSD post-hoc comparisons revealed that Asian American or Pacific Islander group had significantly lower student development scores than Caucasian students in the study on the career planning and lifestyle planning subtasks.

Conclusions

The following conclusions were drawn based upon the findings of the study. Since this study used a purposive sample, these conclusions are limited to the data sample and are not generalizable to the general population of undergraduate students in colleges of agricultural and life sciences.

1. This sample of undergraduates in CALS at UF mirrors the national norms concerning student development as measured by the Student Developmental Task and Lifestyle Assessment (SDTLA). The establishing and clarifying purpose task and the educational involvement, career planning, lifestyle planning, and cultural participation subtask means for this sample were all comparable to the national norms described by the SDTLA.

2. Undergraduates in this sample are familiar with jobs in their career area. However, many remain uncertain about their career decisions, have not taken deliberate steps to learn more about their career area, and are not sure how to maximize their strengths as they prepare for a career. These students have some experience in their career area, but many still do not have a clear picture of the nature of work in their career field.

3. This sample of undergraduates is actively involved in extracurricular activities on campus but not actively involved in student organizations related to their career area.

4. Students participating in this study believe they have become more culturally sophisticated during their time in college.

5. Undergraduates in this sample have not made a firm decision about an academic major but have investigated requirements, deadlines, and opportunities for success in academic majors. They have taken the initiative to schedule conferences with academic advisors, yet they do not have strong levels of interaction with faculty members.

Recommendations

Based on the results of this study, student development personnel in the College of Agricultural and Life Sciences at the University of Florida are encouraged to continue allocating money, attention, and time towards the areas of educational involvement, career planning, lifestyle planning, and cultural participation. Average levels of student development for students in this purposive sample mirrored national norms, yet CALS students are more academically advanced due to relatively high admission standards across the University of Florida. Thus, one might expect levels of student development for this sample to be well above national norms. The use of Chickering's seven vectors to guide student development programs is also recommended. Chickering's theory provides researchers and student affairs practitioners with very useful descriptors of the emotional and psychological transformation that students might potentially undergo in college (Reisser, 1995; Thomas & Chickering, 1984; White & Hood, 1989).

Developing programs that concentrate on individual vectors may help to increase levels of student development. Also, specific programming on selected ideas from individual vectors, such as career planning, is recommended as an approach for increasing student development. Since Chickering suggests a sequential nature to student development, long-term development programs that seek to advance students through the vectors are recommended.

Seminars that focus on career experience, values and goals, and maximizing strengths should be developed in CALS. Multiple opportunities, such as workshops, should be created to encourage development in these specific areas. Online resources should be promoted to increase awareness of academic majors within CALS. More opportunities should also be given for undergraduates to learn about academic majors, cultural events, CALS student organizations, and internships. Increased undergraduate awareness in these areas would allow students to become more involved in CALS, allowing for more opportunities for development.

Increased engagement of faculty with students in organization and academic advising is also recommended. Having increased contact with students would strengthen the relationship between faculty and undergraduates in CALS. Students who interact frequently with faculty members are more likely than other students to express satisfaction with all aspects of their institutional experience (Astin, 1984). Students who are integrated well with faculty members and peers feel a strong sense of acceptance, which in turn, assists them in growing both

intellectually and personally (Kuh, Schuh, & White, 1991). More emphasis should be placed on academic advising, student-professor interactions, and academic success. Creating more opportunities for students to interact with faculty, such as open houses, would increase student comfort levels as they interact with faculty.

If funding can be secured, a follow-up study of levels of student development in the College of Agricultural and Life Sciences at the University of Florida should be conducted using a random sample of all undergraduates. Such a study should use the web-based version of the SDTLA for easier distribution and data retrieval. A broader study would allow generalization of the findings to the college student body and provide a stronger basis for student development programming. In addition, similar studies should be conducted in other colleges of agricultural and life sciences across the nation to further assess to better understand the collective state of student development in agriculture students.

The use of other forms of the SDTLA should be utilized to assess student development in other tasks and subtasks as outlined in Chickering's work. Other areas include the developing autonomy and mature interpersonal relationships task and the emotional autonomy, interdependence, academic autonomy, instrumental autonomy, peer relationships, and tolerance subtasks. More research is also needed to identify the factors that most influence levels of undergraduate student development.

A longitudinal study that uses multiple assessment points over the course of a student's college career would provide valuable insight into the rate and nature of student development. This would also provide the opportunity to test the effect of specific student development intervention programs.

Discussion/Implications

This research shows that undergraduates in CALS at UF that participated in this purposive sample have comparable scores to the national norm as measured by the SDTLA. However, the average scores for CALS students on the SDTLA may indicate that more work needs to be done in the area of student development. What are the optimal levels of student development in colleges of agricultural and life sciences? What potential impact might intervention programs have on levels of student development? These questions arise because “nearly every college and university has an expressed commitment to the development of students” (Boatman, 1999, p. 325).

The natural inclination would be for upperclassmen to report higher scores in all subtasks. However, underclassmen in this study had a slight tendency to have higher levels of student development. This study focused on Chickering’s sixth vector, developing purpose. Chickering and Reisser (1993) proposed a sequential model suggesting that earlier vectors form a foundation for later vectors.

The uncertainty about career decisions expressed by students in this study indicates a need for more internships and career fairs. Internships provide students with a means of bridging the gap between career expectations developed in the classroom and the reality of employment in the real world (Gault, Redington, & Schlager, 2000). Field trips may also be valuable in helping

students gain a better picture of the nature of work in their career area. The lack of student involvement in student organizations related to their career areas suggests that many students are overlooking a potentially valuable learning resource.

Only half of the undergraduates in this sample had made a firm decision about an academic major, while a majority had investigated requirements, deadlines, and opportunities for success in academic majors. With over two-thirds of the sample comprised of upperclassmen, this finding raises serious concern about the academic progress and decision-making of participants in the study and suggests that more informational programs may be needed. Finally, the findings of this study suggests that, in general, faculty must find ways to create a more inviting and nurturing relationship with students so they can provide needed mentoring in academic and career decision making.

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STUDENT EXPERIENCES AS PEER LEARNING ASSISTANTS IN THE LIFE, AGRICULTURAL AND NATURAL SCIENCES

Anna Ball, University of Florida and Neil Knobloch, Purdue University

DISCUSSANT REMARKS:

Barbara M. Kirby, Associate Director and Professor, North Carolina State University

The researchers tackled an important issue: the impact of learner-centered teaching in Colleges of agriculture, food, natural resources, environmental science, life sciences, family and consumer science, etc. whatever we call ourselves, we should be adopting and incorporating not only learner-centered teaching, but also learner-centered teaching partnerships with undergraduate students. The uniqueness of our disciplines, our desire to teach by problem based inquiry and the need to develop leaders in the classroom all point to utilizing students more in the process. The authors do an excellent job through their literature review of introducing the reader to the national rationale that calls for a shift in teaching paradigms as well as the need to investigate the effectiveness of learner-centered approaches to teaching through the lens of the undergraduate peer teacher.

The purpose, objectives and procedures were clearly stated and accomplished. Tables displayed important findings and data were explained in the accompanying text (other than a typo where peer/tutors agreed that their experience helped them understand the real world or is it professional settings M = 3.20 not M = 2.20)? The inductive reasoning study involved a small number of subjects (N=41) yet explored the peer tutoring and teaching effectiveness perceptions of individuals associated with nine different courses in five land grant institutions. The authors did not attempt to over generalize their findings or conclusions for using peer learning strategies in undergraduate education.

Peer tutors and peer teachers responded to 20 items, representing skills they believed that they developed through their tutoring or teaching activities. As a reader, I wanted to extract those that the students agreed with most strongly or those with which they disagreed most strongly. Perhaps ordering the mean scores from highest to lowest would give the reader some relative sense of what the students believed they gained as a result of being a peer assistant. For example, it was exciting to learn that 68% of the students strongly agreed that they made a contribution to the course. So they felt valued. Ordering also helps identify some inconsistencies between frequencies and Mean calculations. For the item “motivation to pursue a teaching-related career” the percentages and frequencies do not result in a Mean score of 3.36, implying that students agreed that they were motivated to pursue a teaching-related career. This could be important for a teacher education profession. Re-organization of Table 1 would strengthen the paper.

Peer tutoring and peer teaching have positive impacts and great potential for enhancing the student/faculty relationship and the learning environment. Several questions come to mind for the profession to consider. Who are the student peer teaching assistants and tutors across the country? Are they in the same class or have they already mastered the class? Is it better for the students to focus on teaching the content rather than learning and teaching? Is it more effective to have the teacher/learner in the same class or should the students be upperclassmen. Given these

findings, what is a plausible model, identifying the inputs, processes and outputs? Congratulations to the researchers for a study that raises interesting implications for the perceived value of utilizing peers in different roles within the teaching and learning experience.

DOES CONGRUENCE BETWEEN ADVISORS' ACADEMIC ADVISING STYLE AND STUDENTS' IDEAL ADVISING STYLE HAVE AN EFFECT ON STUDENT SATISFACTION?

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DISCUSSANT REMARKS:

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Universities are in the business of graduating the next generation of scientists, teachers, engineers, politicians, environmentalists…and the list goes on. Or does it? Are we meeting the needs of the future by graduating trained professionals in a timely manner that can make a difference in our world? According to our authors who shared with us an excellent review of literature on the issue, our institutions are not fulfilling their mission. Substandard retention and graduation rates are related to ineffective advising.. Advising plays a critical role in student retention and graduation rates. Not all advising successfully aids students in persisting toward degree and not all students heed advice. This study focused on advising style and how style may determine congruence or incongruence between the academic adviser and the student. They go beyond describing advising and actually examine the levels of satisfaction as impacted by advising style.

. The study is derived from a strong theoretical base and instrumentation adapted from Winston and Sandor's Academic Advising Inventory (AAI). The purpose, objectives and procedures were clearly stated. A concise display of data aided the reader in understanding the results of the study. Conclusions were appropriate to the research. The paper could be strengthened if the authors would explain why there is so much change in n from the usable responses of 429 students. So others may replicate the study, were classes randomly drawn or stratified on some criteria and then selected or purposely chosen?

Three findings were of major interest and should have some implications for the profession: 1) majority of students (79.8%) identified their current academic advisor as using a developmental advising style; 2) nearly all (95.5%) respondents held developmental advising as their ideal advising style; and 3) approximately 18% of the students experienced incongruence with advising style resulting in dissatisfaction. Students preferred the developmental adviser who introduced them to course requirements and university opportunities, opportunities for socialization and integration into the institution. If 20% of the students in this study who experienced prescriptive advising had developmental advisers, is it likely they would persist? Of the 35% who do not graduate, how many were dissatisfied with their advising? As a profession, how can we most impact professional development for advisers? Describe the programs. Who should advise? If advising is so intimately connected to retention and graduation rates, it is time to further investigate the impact of our programs and identify strategies for improving the advising components of our programs. Congratulations on an excellent study.

LEVELS OF STUDENT DEVELOPMENT IN THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES AT THE UNIVERSITY OF FLORIDA

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DISCUSSANT REMARKS:

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Student Development is an important component of our programs. The purpose of this study was to determine the developmental needs of students in the College of Agricultural and Life Sciences at the University of Florida, specifically in other areas of involvement, career and lifestyle planning, and cultural participation. Too often we are concerned about the grade point average and the time to degree and neglect the need to educate the whole person. In declining budgetary times, student development programs are often the first programs cut. This study contributes to a body of knowledge that quantifies the developmental needs of students that can and should be served through student development.

The study was derived from a strong theoretical base including psychosocial theorist Chickering's "young adult" developmental stage work and use of a normed instrument, form 2.99 of the Student Developmental Task and Lifestyle Assessment (SDTLA), which measured levels of student development on the Establishing and Clarifying Purpose Task of the overall SDTLA. The purpose, objectives and procedures were clearly stated. Data were displayed in tables and discussed in the text. Conclusions and recommendations were appropriate to the research. Perhaps the only suggestion to strengthen the study is to encourage the researchers to implement strategies that will increase response rate. Are 40% of the students usually absent from class or was it because of the study that day? Could differences be determined between respondents and non-respondents?

What are the implications for the profession for this paper? Participants in this study were very similar to the national normative sample as reported and they were familiar with jobs in their career area, had some experience in their career area, had clear priorities for establishing a family, were involved in lifestyle planning activities, had become more culturally sophisticated in college, and took the initiative to arrange conferences with an academic advisor. Is this the case across the country? If this is an important component in the life of our college students, how do we encourage institutional support across the nation? Do all students avail themselves of these resources to further develop career and lifestyle planning areas and if not, how do we get them to participate? Can every student who wants to be part of a leadership program have that opportunity? It would be interesting to further examine the responses of underclassmen vs. the upperclassmen regarding when they believe they need particular services or programs in order to find out what they do not know about career planning or lifestyle planning.

Engaging students and faculty is a key element for retention and college success. It is a concern that students had not formed a personal relationship with faculty members, made a firm decision about an academic major, or joined a student organization related to their career area. To what extent should faculty members and student development personnel be more focused on transitions services and programs for first and second year students? As professionals, how can

we facilitate more engagement of students with faculty members within the institution? Congratulations to the authors on an excellent study exploring an important issue.

Effects of a Math-Enhanced Curriculum and Instructional Approach on Students' Achievement in Mathematics: A Year-long Experimental Study in Agricultural Power and Technology

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M. Craig Edwards, Professor
James G. Leising, Professor
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Abstract

The purpose of this study was to empirically test the posit that students who participated in a contextualized, mathematics-enhanced high school agricultural power and technology curriculum and aligned instructional approach that included intensive teacher professional development would develop a deeper and more sustained understanding of selected mathematics concepts than those students who participated in the traditional curriculum and instruction. This study included teachers and students from 32 high schools in Oklahoma (16 experimental classrooms; 16 control classrooms). Students were enrolled in an agricultural power and technology course during the 2004-2005 school year. The experimental design employed was a posttest only control group; unit of analysis was the classroom. One-way analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were used to test the study's null hypothesis. The level of students' achievement as measured by a traditional test of math knowledge revealed results that held practical significance and supported the use of the experimental treatment. So, those who are charged with providing professional development for secondary agricultural education teachers are encouraged to consider introducing the seven-element approach to their students and teachers.

Introduction

In an era of standards-based reform in education, many believe the best way to raise student academic achievement is through improved teaching (Birman, Desimone, Porter, & Garet, 2000). To that end, Porter and Brophy (1988) maintained that student learning can be improved only if teachers' practices are of high standard; however, they concluded many teachers are not prepared to implement practices that reflect high standards. What is more, professional development for teachers could serve to fill the gap between standards-based reform and pre-service teacher preparation (Birman et al., 2000). Unfortunately, many times the professional development provided to teachers does not adequately prepare them for the rigors of standards-based student achievement (Corcoran, 1995; Darling-Hammond, 1996; Hiebert, 1999; Little 1993; Sparks & Loucks-Horsley, 1989).

In an effort to identify effective professional development for teachers, Birman et al. surveyed a sample of more than 1000 teachers who participated in the Eisenhower Professional Development Program. These researchers identified the following six factors aligned with

effective professional development: 1) *Form*, was the activity planned as a traditional workshop or a reform activity; 2) *Duration*, how many hours were devoted to professional development; 3) *Participation*, were participants from the same or different schools; 4) *Content focus*, to what extent did the professional development activity focus on improving teachers' subject matter knowledge in mathematics or science; 5) *Active learning*, were teachers actively engaged in significant examination of teaching and learning; and, 6) *Coherence*, were teachers encouraged to continue a professional dialog after the professional development session. Results from this study indicated that effective professional development should provide activities that are longer in duration, involve collective participation, afford opportunities for active learning, encourage a deepening of teachers' content knowledge and provide opportunities for continued coherence (Birman et al., 2000).

The issue of professional development that supports school mathematics reform was addressed by Borasi and Fonzi (2002) in a monograph prepared for the National Science Foundation. The authors identified five factors that must be present in professional development programs in order for those programs to meet the needs of teachers of mathematics. Those factors are:

> (1) be sustained and intensive; (2) be informed by what we know about how people learn best; (3) center around the critical activities of teaching and learning rather than focus primarily on abstractions and generalities; (4) foster collaboration; and (5) offer a rich set of diverse experiences. (p. 114)

Notably, a congruence of opinion exists between those who posited factors necessary for effective professional development of teachers in general (Birman et al., 2000) and those who directed their efforts specifically at teachers of mathematics (Borasi & Fonzi, 2002).

The format used to deliver effective professional development for teachers of mathematics may be as important as the factors necessary; what is more, this conclusion may hold for all teachers who strive to improve student achievement in mathematics. Summer institutes, study groups of teachers who meet on a regular basis, a series of workshops held during the school day or after school, and independent work done by the teacher are examples of effective formats for delivering professional development (Borasi & Fonzi, 2002). Moreover, most successful programs use a combination of formats based on the needs of the teachers involved (Borasi & Fonzi, 2002; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Southern Region Educational Board, 2000).

Once the factors necessary for effective professional development are identified and put into practice, the question still remains, "Is professional development of teachers an effective means to improve student achievement?" To that end, Gordon (1999) found that professional development opportunities aimed at improving student achievement were prominent in successful schools. And, Kent (2004) concluded, "Therefore, linking improved teacher quality through effective professional development will ultimately lead to student success" (p. 432).

Harwell, D'Amico, Stein, and Gatti (2000) found similar results in a longitudinal study conducted in school District #2 in New York City. This study, conducted from 1988 to 1998,

explored a variety of factors that influenced student achievement, particularly the role of teacher professional development. During the decade of observation, the percentage of District #2 students who achieved at or above grade level in mathematics rose from 66% to 82%. The researchers concluded that the professional development activities of the teachers may have had some effect.

Further, the use of intensive professional development was found to improve teacher self-efficacy years after the initial professional development session had occurred. For example, Watson (2006) found that teachers' self-efficacy regarding their use of the Internet remained high many years after the initial series of intense professional development sessions had concluded. What is more, some researchers (Mitchell, 2002; Wenger, 1998; White, 2002) have called for the use of "communities of practice" as a cost-effective method to deliver quality professional development for teachers.

Educational practitioners, researchers, and scholars (Gordon, 1999; Harwell et al., 2000; Kent, 2004) have posited that a significant relationship exists between the quality of professional development received by teachers and their future impact on student learning and achievement. However, in order to be effective, professional development must address the critical factors of form, duration, participation, content focus, active learning, and coherence (Birman et al., 2000). Accordingly, effective professional development can have a long term effect on how teachers view their self-efficacy (Watson, 2006). What is more, the use of communities of practice may be an effective way to provide valuable, sustainable, professional development for teachers, including agricultural educators who may be striving to improve their students' achievement in mathematics. Finally, some researchers (Chalmers & Keown, 2006; Mitchell, 2002; Wenger, 1988; White, 2002) have called for the use of "communities of practice" as a cost effective method to deliver quality professional development for teachers

Theoretical Framework

The underlying theoretical framework for this study relies on the model of teaching and learning developed by Dunkin and Biddle (1974) (Figure 1), that was derived from concepts first espoused by Mitzel (1960).

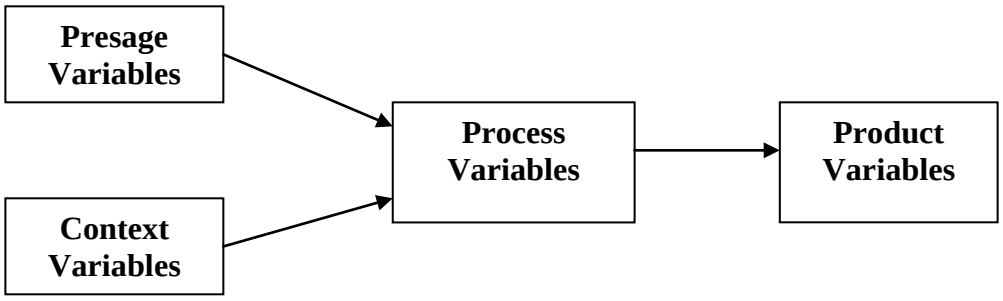

Figure 1. Model for the Study of Classroom Teaching. (Taken from Parr, Edwards, and Leising, 2006, p. 83)

Dunkin and Biddle organized the variables that contribute to teaching and learning into four general classes. The characteristics of teachers that may be observed for their effects on the teaching process are called *presage variables*. Professional development for teachers would be classified as a significant presage variable along with other formative experiences, teacher properties, teacher-training experiences, and any other variable that may be controlled by teacher educators or school administrators are included as presage variables. *Context variables* are those conditions over which a teacher has little control. Pupil formative experiences, pupil properties, school and community contexts, and classroom contexts were variables identified by Dunkin and Biddle as context variables.

Process variables refer to those activities that take place in the classroom during the act of teaching. These variables include behaviors in the classroom demonstrated by the teacher and students, as well as the observable changes in pupil behavior. Finally, *product variables* describe the actual outcomes of teaching (i.e., student achievement in mathematics). The product variables of most interest are immediate pupil growth and long-term pupil effects (Dunkin & Biddle, 1974).

Park and Osborne (2004) used the Dunkin and Biddle model as theoretical support from which to explore the variables necessary to improve student reading, comprehension, critical thinking and motivation to read in the context of agriscience. After completing a review of literature, the researchers grouped the related literature into themes related to presage and context variables. This grouping of literature, based on variables described by Dunkin and Biddle, then allowed the researchers to posit a model for the study of reading in secondary agriscience. Park and Osborne made a strong case as to the utility of the Dunkin and Biddle model for examining the integration of academic and CTE courses, including effects that may be related to improving student academic achievement.

The model posited by Dunkin and Biddle is robust, and, therefore, provides a comprehensive and grounded approach for looking at many of the significant variables associated with the teaching and learning process. This model is also valuable as an aid to summarize research-based knowledge about the teaching and learning process, and it provides a transparent lens to view and interpret the results of this study.

Purpose

The purpose of this study was to empirically test the hypothesis that students who participated in a contextualized, mathematics-enhanced high school agricultural power and technology curriculum (i.e., an experimental curriculum and instructional approach) would develop a deeper and more sustained understanding of selected mathematical concepts than those students who participated in the traditional agricultural power and technology curriculum. The assumption was that students who received the experimental curriculum and instruction would be able to transfer their math learning to new and novel settings (Stone III, Alfeld, Pearson, Lewis, & Jensen, 2005) in their technical field and more broadly, including their performance on a standardized test of mathematics ability.

Research Questions and Null Hypothesis

The following research questions guided the study: 1) What were selected characteristics of students enrolled in and instructors teaching Agricultural Power and Technology in Oklahoma during the 2004-2005 school year? 2) What was the effect of a math-enhanced agricultural power and technology curriculum and aligned instructional approach on student performance as measured by a traditional test of student math ability? The following null hypothesis guided the study's statistical analyses: H_o There is no difference between the two study groups on math performance as measured by a conventional standardized test of math achievement.

Methods and Procedures

This year-long study was conducted as a result of a pilot study carried out during the spring 2004 semester (Parr, 2004). Accordingly, the investigation's research questions and null hypothesis echo those of the pilot study (Parr). Both studies were conducted as one replication of a larger study (Stone III et al., 2005); the pilot being one of six replications and this study one of five replications nationwide. All involved a different career and technical education curriculum area. The National Research Center for Career and Technical Education (NRCCTE) funded and facilitated coordination of the larger study.

This study utilized a posttest only control group experimental design (Campbell & Stanley, 1963). The volunteer teacher participants and their classrooms were randomly assigned to either the experimental or control groups. Accordingly, the resulting units of analysis were intact classrooms. The randomly assigned classrooms were pre-tested to determine level of equivalence regarding students' basic mathematical skills (Campbell & Stanley, 1963; Tuckman, 1999). The Terra Nova CAT Survey examination (25 items) was used as the pre-treatment measure to establish equivalence of groups prior to the experiment; the test had a reliability coefficient of 0.84 (Cronbach's alpha) (McGraw-Hill, 2000). The Terra Nova CAT Basic Battery (46 items) that was used as a post-treatment measure for evaluation of general math ability has a reliability coefficient of 0.91 (Cronbach's alpha) (McGraw-Hill, 2000).

The design of this study was chosen based on its robust nature and its adherence to the U.S. Department of Education's standards for considering funding of educational practices that are supported by research using experimental designs whereby participants are randomly assigned to treatment and control groups (U.S. Department of Education, 2003a). In addition, this study followed the guidelines set forth by the U.S. Department of Education (2003b) for evaluating whether an intervention is supported by rigorous evidence by using outcome measures that are considered "valid."

The treatment in this study consisted of the *Math-in-CTE* model developed by the NRCCTE. The model involved both a particular pedagogy and a prescribed process that can be expressed in the following mathematical equation: (Pedagogy)(Process) = Student Math Performance. This model is based on the basic assumption that occupations aligned to career and technical programs are rich in math content and thus Career and Technical Education (CTE) programs, including secondary agricultural education, should strive to enhance the math embedded in their existing curricula. This model was developed to assist CTE teachers,

including agricultural education instructors, in identifying math in their curricula and to improve their instruction as it related to those math concepts. The goal of such instruction was for students to view math as they would any other tool (e.g., a saw, a tractor, a plow) necessary to complete a task in their occupational area (Stone III et al., 2005).

The pedagogical part of the NRCCTE model for this study consisted of 17, math-enhanced, agricultural power and technology lessons developed by the experimental agricultural education teachers and their math teacher partners during the pilot study (Parr, 2004). These lessons were refined further at additional professional development sessions provided for teachers during the summer of 2004, prior to the 2004-2005 school year (Young, 2006). All lessons were revised and improved to conform to the NRCCTE model for a math-enhanced lesson (Figure 2).

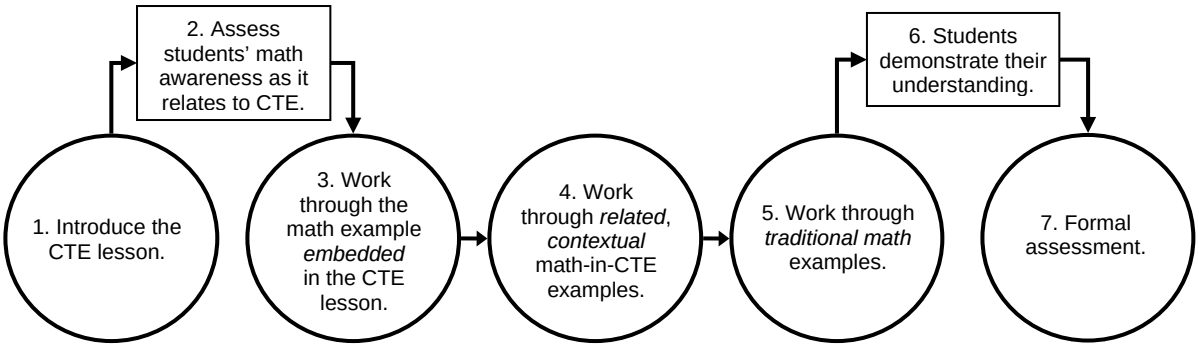

Figure 2. The NRCCTE Model: The Seven-elements of a Math-Enhanced Lesson (Stone III et al., 2005)

The development of math-enhanced agricultural power and technology lessons and the treatment's pedagogy (i.e., an aligned instructional approach) was just one aspect of the NRCCTE model. The study's treatment also included the creation of a process by which agricultural education teachers in the experimental group learned to develop and teach the math-enhanced agricultural power and technology lessons. This process consisted of sustaining the agriculture-math teacher partnerships (i.e., communities of practice), curriculum mapping, developing a scope and sequence for teaching the lessons, providing sustained professional development, and implementing the lessons. According to Dunkin and Biddle (1974), the abovementioned teacher professional development experiences were *presage* variables.

The experimental group agricultural education teachers and their math teacher partners participated in approximately 11 days of professional development over the course of this study The goal and objectives of the professional development component of this study's treatment were outlined at a Math-in-CTE Year 2 Planning Meeting held in Minneapolis, MN June 4-5, 2004 (National Research Center for Career and Technical Education, 2004):

> The overarching goal of the professional development aspect of the study is to prepare teachers to reinforce students' understanding and mastery of higher-level math concepts and skills by enhancing the math that already exists in the CTE curriculum. The professional development sessions will reinforce and build on the teachers' content and

pedagogical knowledge. Math-enhanced lessons developed in year 1 of the study will be critiqued and improved. New lessons, based on the identification of mathematics concepts within specific CTE courses, will be developed in year 2 to further help teachers emphasize and enhance math as part of their CTE classroom instruction. (p. 9)

During the study, the control group teachers were asked to teach their agricultural power and technology classes using the same curriculum and teaching method(s) (i.e., "traditional instruction") they had used previously. Due to the nature of the study, the researcher had very limited contact with members of the control group. Control group teachers' students were made available for testing per the study's testing regimen, which was carried out by testing liaisons (Young, 2006).

Findings

Selected characteristics of participating students and teachers were summarized using frequencies and percentages calculated from the study's questionnaires. The pre-treatment measure used to determine the equivalency of groups regarding students' general mathematical ability was analyzed using one-way analysis of variance (ANOVA). Due to finding a significant difference (p = .047) between the experimental and control groups based on results of the pre-treatment measure, comparative analysis of the posttest mathematics achievement measure was conducted using the analysis of covariance (ANCOVA) procedure.

Selected Characteristics of Students and Teachers

The student pre-treatment questionnaire revealed that the student participants were mostly male (77.5%) and of European/Anglo descent (62.9%). However, one-in-four students reported their race as Native American. Most of the students were either 16 (29.5%) or 17 (31.4%) years of age at the time of the study, and were enrolled almost equally in the 12th (28.8%), 11th (31.9%), and 10th grades (32.1%). Approximately 7-in-10 (70.5%) students reported that their average grades for all courses were mostly B's and C's or higher. Except for one teacher participant, all were male (96.9%). Nearly 4 of 5 teachers (78.1%) reported they were of European/Anglo descent.

Pre-treatment Analysis

In the fall of 2004, the two groups of student participants were tested using the Terra Nova CAT™ Survey Edition (CTB/McGraw-Hill) examination to determine the equivalence of groups in regard to their general math ability. The control group mean score for this examination was 49.21 with a standard deviation of 8.23; the experimental group mean score was 43.44 with a standard deviation of 8.01 (Table 1). A comparison of this data using a one-way ANOVA indicated that a significant difference in mean scores existed between the groups on general math ability at an *a priori* determined alpha level of .05 (p = .047; Table 2); the control group students scored significantly higher on the examination.

Table 1

Descriptive Statistics for Student Math Performance by Group on the Terra Nova Survey Examination (Pre-treatment Measure)

	n	Mean	*SD*	Minimum	Maximum
Control	18	49.21	8.23	33.11	67.20
Experimental	16	43.44	8.01	28.67	57.25
Total	34	46.50	8.521	28.67	67.20

Note. The total number of classes that took the Terra Nova Basic Survey Examination differ when compared to the total number of agricultural education teachers who participated in the study (N = 32) due to the fact that two control group teachers taught two sections of agricultural power and technology. Thus, two sections (classes) were tested for each of those teachers.

Table 2

Comparative Analysis of Student Math Performance by Group Means as Measured by the Terra Nova Survey Examination (Pre-treatment Measure)

	SS	*df*	*MS*	*F*	*p*
Between Groups	282.208	1	282.208	4.271	.047*
Within Groups	2114.349	32	66.073		
Total	2396.557	33			

*$p < .05$.

The use of a pre-treatment measure to determine equivalency of groups regarding general math ability prior to administration of the treatment is a method of reducing experimental error using statistical means rather than experimental (Keppel, 1991). As a pre-treatment measure, the test becomes a covariate and is useful in further refining experimental error and to adjust treatment effects when differences between the experimental and control groups are determined prior to the treatment (Keppel, 1991). Due to finding a significant difference between the experimental and control groups on the pre-treatment measure, analysis of the posttest math examination was done using the analysis of covariance (ANCOVA) procedure.

Posttest Analysis

To address the study's null hypothesis, student participants in both the experimental and control groups were tested on their general math ability using the Terra Nova CAT™ Basic Battery (CTB/McGraw-Hill) Level 21/22 Form A examination after the treatment was completed. The control group mean score was 44.97 with a standard deviation of 14.72, and the experimental group mean score was 46.17 with a standard deviation of 11.07 (Table 3). Although the experimental group students scored higher, an ANCOVA comparison of this measure revealed no significant difference in general math ability between the groups following the treatment (p = .125) at an *a priori* determined alpha level of .05 (Table 4). The null hypothesis was not rejected based on this analysis. Equality of variances was assured with a Levene's Test (α = .696). Effect size was also calculated using Keppel's (1991) formula for Omega squared ($\acute{\omega}^2$ = .031); a "small" effect (Cohen, 1977) was revealed.

Table 3

Descriptive Statistics for Student Math Performance by Group on the Terra Nova Basic Battery Examination

	n	Mean	*SD*	Minimum	Maximum
Control	18	44.97	14.74	19.57	76.09
Experimental	14	46.17	11.07	21.74	60.14
Total	32	45.50	13.06	19.57	76.09

Table 4

Comparative Analysis of Student Math Performance by Group as Measured by the Terra Nova Basic Battery Examination with Pre-treatment Measure as a Covariate

Source	*SS*	*df*	*MS*	*F*	*p*
Pre-treatment Measure	2079.080	1	2079.080	18.847	.000*
Between Groups	275.997	1	275.997	2.502	.125
Within Groups	3199.090	29	110.313		
Total	5289.569	31			

*$p < .05$.

Note. Degrees of freedom differ for the Terra Nova Basic Battery Examination when compared to the pre-treatment measure due to the random assignment of the three mathematics posttests to two classrooms in the experimental group with small numbers of students, which prevented all three measures being administered in those classrooms.

Conclusions

This study found that the student participants were mostly male and of European/Anglo descent. However, one-in-four students reported their race as Native American. Most of the students were either 16 or 17 years of age at the time of the study and were enrolled almost equally in the 10th, 11th, and 12th grades. Approximately, 70% of students reported that their average grades for all courses were mostly B's and C's or higher. Except for one participant all teachers were male, and nearly 80% reported they were of European/Anglo descent.

Within this particular population, a math-enhanced agricultural power and technology curriculum and aligned instructional approach did not result in a significant increase ($p < .05$) in student performance as measured by a traditional test of student math ability (i.e., Terra Nova CAT™ Basic Battery) ($p = .125$). Although no significant difference was detected for the study's null hypothesis, the post-treatment measure of student math achievement did show a positive effect in favor of the experimental group (Table 3). What is more, the comparison of students' Terra Nova CAT™ Basic Battery performance revealed results that held practical significance ($\acute{\omega}^2 = .031$).

Implications and Discussion

Although no significant differences were detected for the study's null hypothesis, the post-treatment measure of student math achievement did show a positive effect in favor of the experimental group (Table 3). In addition, the Terra Nova CAT™ Basic Battery also revealed results that held practical significance. These results support the value of professional development for teachers and its relationship to student achievement (Gordon, 1999; Harwell et al., 2000; Kent, 2004). It is important to note that experimental group agricultural education teachers and their math teacher partners participated in approximately 11 days of professional development over the course of this study. Moreover, a review of the agendas from those professional development sessions (Young, 2006) revealed congruence with five factors identified by Borasi and Fonzi (2002) necessary for professional development that supports school-based mathematics education reform.

One positive outcome of the intensive professional development associated with this study was the emergence of communities of practice. The construct "community of practice" as used in this study is consistent with the theory espoused by Wenger (1998) and described in educational practice by Yamagata-Lynch (2001). Although Yamagata-Lynch suggested that "community of practice" be used as a metaphor for analyzing current practices, she also promoted the idea of examining the advantages and disadvantages of using "communities of practice" as tools for crafting educational environments, including learning contexts that hold promise for improving student achievement. So, the identification of factors inherent to the design of this study that resulted in the transformation of teacher teams as described by Parr (2004) into communities of practice is worthy of additional inquiry.

Further, would the development of "communities" early in teachers' professional careers result in the establishment of communities of practice that, in turn, create vibrant and effective schools where the quality of student learning is exemplary? Using the concept of communities of practice as a tool for designing effective educational environments, research regarding the development of communities of practice among pre-service agricultural education teachers and pre-service academic teachers may be warranted.

Additionally, this study may negate the concerns asserted by some scholars (Bjork & Richardson-Klavhen, 1989; Carraher, 1986; Lave, 1988; Saxe, 1989) regarding knowledge that is bound too tightly in a particular context, thus limiting its transfer to new and novel settings (Stone et al., 2005). For example, it appeared that experimental group teachers who used the seven-element, math-enhanced lesson plan and aligned instructional approach enabled their students to better transfer the math skills they learned (i.e., as evidenced by students' performance on the Terra Nova CAT™ Basic Battery examination) with a small level of practical significance ($\acute{\omega}^2 = .031$). What is more, according to the *Publication Manual of the American Psychological Association*, 5th edition, (2001) failure to report effect sizes (i.e., practical significance) is one of seven common errors found in the design and reporting of research. The manual states further that,

> For the reader to fully understand the importance of your findings, it is almost always necessary to include some index of effect size or strength of relationship in your Results

section. . . . The general principle to be followed, however, is to provide the reader not only with information about statistical significance but also with enough information to assess the magnitude of the observed effect or relationship. (pp. 25-26)

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SELF-REPORTED LEVEL OF MATHEMATICS INTEGRATION OF OUTSTANDING VIRGINIA AGRICULTURAL EDUCATORS

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Abstract

This study is a part of a larger investigation which focused on determining the attitudes, perceptions, level of integration, and perceived needs of outstanding agricultural education teachers. The purpose of this study was to determine the outstanding agricultural teachers' level of mathematics integration into each agricultural course taught and provided baseline data as the agricultural education instructors' increase their integration of mathematics. The participants of this study were selected by a panel of experts who frequently visit agricultural education teachers and observe them teaching. The panel reached a consensus on 26 outstanding agricultural education teachers. An electronic survey instrument was developed by the researcher. The teachers reported integrating mathematics in a range from 0 to 75% in individual agricultural courses.

Introduction/Theoretical Framework

Agricultural education has been present in public schools since their development in America. Minnesota was the first state to offer secondary agricultural education with the first school organized in 1888. By 1910, Virginia promoted agricultural education through Congressional district agricultural schools. A total of 30 states had agricultural education courses established in the public schools systems prior to the Smith Hughes Act, which was passed in 1917 (Phipps & Osborne, 1988). The Smith-Hughes Act provided funding to promote and establish agricultural education courses.

Phipps and Osborne (1988) noted that agricultural education has developed deep philosophical roots, placing a great deal of emphasis on pragmatism. "The practical application and successful transfer of knowledge, skills, and attitudes into real-world settings is the goal of instruction" (p. 19). Phipps and Osborne (1988) further acknowledged that "agricultural education has been cited as an innovative program model for education, in order to maintain an innovative program, efforts have been made to reshape agricultural education programs to ensure their continued value, relevance, vitality, and quality" (p. 14).

The need for educational reform surfaced from the National Commission on Excellence in Education's (1983) report suggesting that American students are falling behind those in other nations. As a result of the report, titled *A Nation at Risk*, high school graduation requirements for academic subjects increased since 1983 (Barrick, 1992; Campbell, Hombo, & Mazzeo, 2000). The increased academic requirements have come at the expense of career and technical education courses (Cetron & Gayle, 1991). Studies have indicated that the increase in academic coursework has not led to an increase in academic achievement (Clune & White, 1992; Hoffer, 1997). National Assessment of Educational Progress scores for mathematics have been relatively flat for the past 30 years (Castellano, Stringfield, & Stone, 2002).

At the same time, traditional mathematics instruction has experienced a great deal of scrutiny. One of the reoccurring themes suggests that in academic programs, students are lectured to about theories and principles, but are never shown how these theories and principles can be applied to real situations (Bottoms & Sharpe, 1996). Researchers have suggested that mathematics as it is being taught in American schools lacks the real-world "connection" and "context" needed to be learned and applied effectively (Britton, Huntley, Jacobs, & Weinberg, 1999; Hoachlander, 1999; Parnell, 1995; Resnick & Hall, 1998; Von Secker & Lissitz, 1999). Mathematical educators have expressed a need to reform mathematics education; one of the themes that emerged is contextually based learning (Briner, 1999).

Career and technical education courses have also come under scrutiny. Some researchers have expressed concern that skills are taught simply by showing a student how to perform an operation without properly training the student in the theory behind the operation (Parnell, 1996). Warmbrod (1974) stated that "if vocational education assumed its proper role in American education that vocational education must be concerned with the student's intellectual, social, and cultural development as well as their vocational development" (p. 5). Phipps and Osborne

(1988) praised agricultural education; however, they pointed out that one of the image problems associated with agricultural education programs is the emphasis placed on the vocational skills.

Warmbrod (1974) indicated that vocational education should be held accountable for students' achievement in both academic and vocational skills. Phipps and Osborne (1988) stated that agricultural education should promote meaningful and practical applications of subject matters, such as mathematics. The National Research Council (1988) indicated that in order for secondary agricultural education courses to remain effective, programs must provide a strong emphasis on traditional academic skills.

The lack of application of the theories and principles taught in the academic classroom and the lack of theories and principles associated with the skills taught in the career and technical education courses have left a gap (Parr, 2004). The lack of connection between subject matter in secondary schools has been widely recognized for a number of years (Glasgow, 1997; NASSP, 1996). This gap between practice and theory must be bridged (Parr, 2004). Warmbrod (1974) indicated that theories and principles must be linked with the application and practice. According to a guide for implementing curriculum integration published by The Ohio State University (Center on Education and Training for Employment, 1998), this bridge could come in the form of contextualized learning.

Agricultural education has great potential to deliver relevant curriculum that engages students with hands-on and minds-on learning environments that are rich with real world applications of mathematics (Shinn et al., 2003). Agricultural education, by the very nature of its structure and content, can be used to teach information which may be difficult to teach in other settings (Drawbaugh & Hull, 1971). Phipps and Osborne (1988) linked academic and vocational education, specifically agricultural education stating that:

> Vocational education in agriculture (i.e., agricultural education) is an integral part of public school education and contributes to the general objectives of education. It contributes to the development in students of the ability to think and study and in the ability to solve problems efficiently, which require skill in collecting and interpreting data. (p. 9)

Agricultural education provides that authentic context in which students can apply the concepts and skills grounded mathematic theory (Conroy, Trumbull, & Johnson, 1999). Parr (2004) found that a math-enhanced agricultural curriculum had a positive effect on student math performance, while maintaining the vocational skills associated with the curriculum. According to Bottoms and Sharp (1996), integration of both academic and vocational skills into content areas such as agricultural education holds great potential for enhancing student learning in critical academic, technical, and personal areas.

Drosjack (2003) reported that fewer than one in every three students nationally are able to do math at a proficient level. The Bayer Corporation (2003) found that 9 out of 10 U.S. citizens are concerned that today's students may not have the mathematical skills to produce the excellence required for homeland security and economic leadership in the 21st century. Students today require strong mathematical knowledge and skills in order to pursue a higher education, compete in the technology driven workforce, and be informed citizens (VDOE, 2005). Agricultural education instructors are required by the standards set forth in the Carl D. Perkins Act of 1998 to integrate academics into the agricultural education curriculum.

Miller and Gliem (1993a as cited in Hunnicutt, 1994) found that nearly half of the agricultural education teachers studied in Ohio did not coordinate their efforts to integrate mathematics into the agricultural education curriculum with mathematics teachers. Gliem and Warmbrod (1986, as cited in Shinn, 2003) encouraged agricultural education departments to attempt to integrate practical mathematics applicable to agriculture into the curriculum. Hunnicutt (1994) indicated that agricultural education instructors in Alabama self-reported that they integrated mathematics into 26-50% of the units in the agricultural education curriculum. Parr (2004) found mathematically enhanced agricultural power and technology courses in Oklahoma had a positive effect on student math performance.

Purpose of the Study

The purpose of this study was to determine the outstanding agricultural teachers' level of mathematics integration into each course currently taught.. This study provided baseline data as the agricultural education instructors in Virginia increase their integration of mathematics. The study will result in proposed actions to increase mathematics integration into agricultural education curriculums. Research objectives investigated in this study are:

1. Describe the characteristics of outstanding agricultural education instructors who were nominated by Virginia agricultural education leaders and the programs in which these instructors teach.
2. Describe the self-reported level of integration of mathematics by each instructor and across instructors for each course taught.

Methods/Procedures

The participants of this study were selected by a panel of experts who frequently visit agricultural education teachers and observe them teaching. The panel reached a consensus on 26 outstanding agricultural education teachers using the following criteria: Knowledgeable of the agricultural education curriculum in Virginia; willing to accept change; provide an in-depth analysis of the questions; willing to complete the study thoroughly; and able to communicate effectively through email.

An electronic survey instrument was developed by the researcher. The survey instrument was created based on the review of the literature regarding academic integration into the career and technical education and agricultural education curricula. Principles of electronic survey design from Dillman's (2000) tailored design method were consulted when constructing the instrument. A group of 10 Agricultural and Extension Education pre-service teachers completed the instrument while they were student teaching in order to field test the instrument. Upon completion of the field-tested instrument, the pre-service teachers were given the opportunity to provide additional suggestions for improvement of the instrument and report any technical problems to establish face validity. Reviews of responses indicated that only minor revisions were needed and these changes were made prior to data collection. The data collected from the field test allowed the researcher to analyze the reliability of the instrument which yielded a Cronbach's alpha coefficient of $\alpha = 0.868$ and a Spearman-Brown coefficient of $\alpha = 0.874$. However the results from the study yielded a lower reliability score for both Cronbach's alpha and Spearman-Brown (0.64 and 0.66 respectively). The change in reliability scores may be due to the fact that the student teachers in the field study all received prior instruction on academic integration.

The responses from the online survey were automatically downloaded into a Microsoft Excel worksheet. The time allotted for data collection was three weeks as recommended by Dillman (2000) and Truell, Bartlett, and Alexander (2002). The survey data were analyzed using the Statistical Package for the Social Sciences (SPSS) 13.0 Student Version for Windows. Data associated with research question were analyzed using descriptive statistics. Frequencies, percentages, means, and ranges were calculated for each outstanding agricultural education instructor's overall integration of mathematics and for each agricultural mechanics course taught. The number of instruments that were completed was 25, resulting in a 96% return rate.

Results/Findings

Research objective one was aimed at determining demographic information for the respondents. The outstanding agricultural education teachers had range of 5 to 34 years of teaching experience, with a mean of 17 years. However, 44% of the respondents had 5- 10 years of teaching experience and 44% of the respondents had 20 or more years of experience. The mean age of the 25 outstanding agricultural education teachers was 40 (SD = 9.08) with a range of 29 to 59. Caucasians accounted for 96% of the respondents, while there was only one African American. Fifty-six percent of the respondents were males and 44% were females.

A bachelor's degree and master's degree were the only two levels of education indicated by the outstanding agricultural education teachers. The findings indicated that 52% had master's degrees, while 48% had bachelor's degrees. All 25 outstanding agricultural teachers had an endorsement in agricultural education, while three had an endorsement in science and one had an endorsement in both mathematics and business. Seventeen (68%) of the respondents indicated holding a Collegiate Professional License while respondents with a Postgraduate Professional License accounted for the other eight (32%). More than three fourths of the respondents (76%) taught at the high school level and 24% taught at the middle school level. Ninety-two percent of respondents indicated membership in the Virginia Association of Agricultural Educators (VAAE), the state professional association for agricultural education teachers. The frequencies and percentages for selected teacher characteristics are listed in Table 1.

Table 1
Summary of Selected Teacher Characteristics (n=25)

		f	%
Level of Education	Bachelor's Degree	12	48
	Master's Degree	13	52
Gender	Male	14	56
	Female	11	44
Ethnicity	African American	1	4
	Caucasian	24	96
Grade Level Taught	Middle School	6	24
	High School	19	76
Member of VAAE	Yes	23	92
	No	2	8

A majority (68%) of the respondents completed 4-5 mathematics courses in high school. A majority (56%) of the respondents did not complete a mathematics course at a two-year college and/or community college, but a range or 1-4 courses at this level was reported by 34% of the agricultural education teachers. Forty-eight percent of the respondents completed 2 to 3 mathematics courses at a four-year college or university. The number of courses completed by the outstanding agricultural teachers is indicated in Table 2.

Sixty percent of the respondents taught in an urban school, while 40% of the respondents taught in a rural school. The largest number of departments (n=10, 40%) had two teachers as indicated by the respondents. Departments with only one agricultural education teacher made up 28% and three teacher departments were reported by 24%. The respondents (n=25) reported a range of 62 to 440 students enrolled in their agricultural education programs with a mean of 188 students (SD= 76.67). Only three agricultural education teachers indicated that students receive academic credit outside of agricultural education for courses completed in that department. Two teachers said that students received a science elective credit for completing an agricultural education course while one indicated students receive a forestry credit. A majority (22) indicated that students did not receive any academic credit for courses taught in their department. Forty percent of the respondents' schools utilized the A/B block scheduling system. Schools that used the 4x4 block system made up 28%, and the seven-period system was reported by 24% of the respondents. The frequencies and percentages for selected program characteristics are listed in Table 3.

The agricultural education teachers (n=24) reported a mean of 21.63% of course content that utilizes mathematics in their curriculum, with a standard deviation of 11.34. The respondents indicated a range of 4 to 47% of mathematics integrated per teacher. The teachers reported integrating mathematics in a range of 2 to 75% in individual agricultural education courses. The 24 teachers reported teaching 29 different courses. There were seven courses that were taught by only one teacher and six courses by only two teachers. There were seven courses that were taught by at least five teachers, with agricultural mechanics and basic plant science I being taught by the most teachers (10). The seven courses taught by at least five different teachers had a range of 8.60 to 26.43 mean percentage of mathematics integration. Information for each course taught is presented in Table 4.

Table 2
Mathematics Courses Completed by Respondents (n=25)

		f	%
Mathematics Courses Completed in High School	1	1	4
	3	2	8
	4	11	44
	5	1	4
	6	4	16
Mathematics Courses Completed in Community College	0	14	56
	1	4	16
	2	2	8
	3	2	8
	4	1	4
Mathematics Courses Completed at University	0	5	20
	1	2	8
	2	6	24
	3	6	24
	4	3	12
	6	2	8

Note: Totals do not equal 100% due to non-respondents.

Table 3
Summary of Selected Program Characteristics (n=25)

		f	%
Location of School	Urban	15	60
	Rural	10	40
Agricultural Education Teachers on Campus	1	7	28
	2	10	40
	3	6	24
	4	2	8
Type of School Schedule	7 Period	6	24
	8 Period	2	8
	A/B Block	10	40
	4x4 Block	7	28

Table 4
Percentage of Mathematics Integrated per Course (n=25)

Course Number	Title	N	Minimum	Maximum	Mean	SD
8035	Greenhouse Plant Production and Management	1	75	75	75.00	0.00
8024	Agricultural Business Operations IV	2	45	50	47.50	3.54
8022	Agricultural Business Fundamentals III	3	40	50	45.00	5.00
8026	Agricultural Business Operations V	1	45	45	45.00	0.00
8073	Applied Agricultural Concepts	1	40	40	40.00	0.00
8014	Operating the Farm Business IV	4	25	50	33.75	11.09
8042	Forestry, Wildlife, and Soil Management IV	3	20	40	28.33	10.41
8010	Agricultural Production Technology III	3	15	45	26.67	16.07
8008	Agricultural Mechanics and Basic Animal Science II	7	10	50	26.43	12.33
8004	Agriscience and Technology	6	15	50	25.00	13.04
8082	Small Engine Repair	3	25	25	25.00	0.00
8016	Introduction to Power, Structural, and Technical Systems	7	20	35	23.57	5.56
8006	Agricultural Mechanics and Basic Plant Science I	10	10	50	22.90	12.33
8012	Agricultural Production Management IV	3	15	30	21.67	7.64
8036	Landscaping	2	15	25	20.00	7.07
8003	Agriscience Exploration	8	15	20	18.75	2.312
8018	Agricultural Power Systems	3	10	35	18.33	14.43
8040	Introduction to Natural Resources III	4	0	40	17.50	16.58
8084	Small Animal Care II	2	5	20	12.50	10.61
8088	Veterinary Science	2	5	20	12.50	10.61
8080	Equine Management Production	3	5	20	11.67	7.64
8002	Introduction to Agriscience	6	5	15	9.17	3.76
8034	Horticulture Science	5	3	15	8.60	4.72
8038	Floriculture	2	5	12	8.50	4.95
8065	Exploratory Agriculture	1	8	8	8.00	0.00
8000	Floral Design I	1	5	5	5.00	0.00
90916	Leadership and Communication	2	0	5	2.50	3.54
8083	Small Animal Care I	1	2	2	2.00	0.00

There were only three courses that were taught by at least two agricultural education teachers that had a mean percentage of integration over 30%; all three courses were agribusiness courses. The teachers of the five agricultural mechanics reported integrating mathematics at the second highest level ranging from 18.33 to 26.43%. The floriculture, floral design, and horticulture courses yielded the lowest percentages of integration, ranging from 5 to 8.6%. However, landscaping yielded 20% of mathematics integration and greenhouse management yielded 75% integration. The agricultural mechanics and Basic Plant Science I course that was taught by the most agriculture teachers yielded 22.9% mathematics integration.

Conclusions

The results of this study may be helpful for state leaders in agricultural education by providing the self-reported level of mathematics integration among these selected outstanding agricultural education teachers in Virginia. The mean indicated that the typical agricultural education teacher in this study integrated mathematics into 23% percent of their lessons. The younger agricultural education teachers tended to integrate mathematics at a higher percentage than older agricultural education teachers. It was noted that the percentage of integration of mathematics is lower than the percentage of integration among agricultural education teachers in Alabama as reported by Hunnicutt (1994). However, Hunnicutt gave the agricultural education teachers the option to select a range 0 to 25, 26 to 50, 51 to 75, and 76 to 100 in their total curriculum; this researcher had the teachers report the level of integration for each course they taught in agricultural mechanics.

The results of this study are also helpful in acknowledging that there was a negative relationship between percentage of mathematics integration and years of teaching and age. This could help teacher education program leaders recognize that their efforts to help pre-service teachers to integrate mathematics may have helped thus far. This also provides teacher education programs with the benchmark data to know that additional efforts to integrate academics into the agricultural education curriculum. This data also provides insight to curriculum specialists to identify the needs among agricultural education teachers regarding mathematics integration.

Recommendations for Implementation

The following recommendations are based upon the findings and conclusions of this study.

1. Agricultural education practitioners should continue to emphasize the importance of academic integration into the agricultural education curriculum to improve student learning.
2. Agricultural education practitioners should continue to link academic standards of learning to each agricultural education competency. Agricultural educators should take it upon themselves to reinforce the Virginia Standards of Learning or similar standards in other states to help students connect the principles to real-life applications.
3. Agricultural education curriculum specialists should continue to develop integrated learning activities that reinforce the academic theories and principles with agricultural mechanization applications.
4. State agricultural and mathematics education leaders should develop workshops that utilize hands-on activities that integrate academics. The workshops should place the teachers in the student role. The workshops should be practical, allowing the teachers to take what they learned in the workshop and implement it into their lessons.
5. Textbook companies that develop teacher education materials need to develop more materials that emphasize the academic theories and principles that are being integrated into the agricultural mechanization content; specifically, the materials should utilize team activities, real-life applications, and revamp current laboratory activities.
6. Virginia educational leaders should develop a standardized curriculum that includes generic lesson plans that utilize all of the Virginia Standards of Learning and workplace readiness skills associated with each lesson. These lessons will help in-service teachers who need help integrating academics into their lessons.
7. State professional organizations should invite agricultural education teachers from programs that offer mathematics credit through agricultural education courses to serve as workshop presenters to share how they integrate mathematics.

Recommendations for Further Research

The following recommendations are based upon the findings and conclusions of the study.

1. Conduct an in-depth study that investigates the lessons plans of in-service teachers to determine to what extent they are integrating mathematics, where they are emphasizing mathematics, and where they could be integrating mathematics.
2. Investigate the achievement levels of students who receive applied mathematics instruction vs. traditional mathematics instruction in the schools that are currently offering mathematics credit for students who complete a mathematics applied to agriculture course.
3. Conduct a study that investigates the pre-service teachers' attitudes and academic problem-solving abilities before and after completing an agricultural education course that integrates academics.
4. Conduct a study that investigates the level of academic integration by teachers after they participate in workshops that emphasize academic integration.
5. Investigate the integration of other academic areas such as English, social studies, and foreign languages.
6. Conduct a study to investigate students' attitudes toward receiving mathematics credit for completing an agricultural education course that integrate mathematics.
7. Conduct a study that investigates mathematics teachers' attitudes toward mathematics integration into the agricultural education curriculum and their attitudes toward mathematics integration into the agricultural education curriculum and their attitudes toward collaboration with the agricultural education teachers.
8. Replicate this study comparing agricultural education teachers who have been teaching since 1988 to those agricultural education teachers who have been teaching prior to 1988, when the name vocational agriculture was changed to agricultural education.

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INTEGRATING ACADEMICS INTO AGRICULTURE PROGRAMS: A DELPHI STUDY TO DETERMINE PERCEPTIONS OF THE NATIONAL AGRISCIENCE TEACHER AMBASSADOR ACADEMY PARTICIPANTS

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Abstract

This study investigated the perceptions of participants in the National Agriscience Teacher Ambassador Academy as to the next steps the agricultural education profession should take to move forward in the area of integration academic subject matter into agricultural education courses. All members of the 2007 Academy participated in the study. These expert teachers identified key action items in the area of curriculum, professional development, teacher preparation programs; the need for a philosophical shift, and collaboration. Using the Delphi Technique, consensus was reached on 34 different recommendations in these five different areas.

Introduction

Many high school students do not have the math and science skills necessary to be successful in college or to compete in today's high skill careers (National Research Center for Career and Technical Education, 2007). Authentic learning of academic skills through real-world contexts has been identified as an important avenue for supporting higher student achievement (Edwards, 2004). Research on teaching and learning supports the practices identified within career and technical education that is related to the contextualization of learning. In a 2000 study, Conroy and Walker indicated agricultural education provides relevance and context for student success in academics.

Over the past several decades, a number of consistent themes emerged from educational reform reports and initiatives. Prominent themes include the integration of academic and career and technical education (Rojewski, 2002). In the past decade, federal legislation authorizing funding for Career and Technical Education began to mandate improved academic achievement. The 1990 Carl D. Perkins Vocational Education and Applied Technology Act committed federal funding to integrating academics into vocational education. Each reauthorization of Perkins funding emphasized integrating academics into career and technical education. Additionally, The United States Department of Agriculture funded competitive grants that were designed to strengthen agricultural education by incorporating agriscience into science (U.S. Department of Agriculture, 1999).

Research findings indicate that integration of academics into the agriculture curriculum is an effective way to teach math, science, and reading. Studies support the findings that students taught by integrating agricultural and scientific principles demonstrated higher achievement than students taught by traditional approaches (Chiasson & Burnett, 2001; Enderlin & Osborne, 1992; Myers & Dyer, 2006; Parr, Edwards, & Leising, 2006; Roegge & Russell, 1990; Whent & Leising, 1998). Attitudinal studies of agriculture teachers have all provided information regarding the perceived barriers, attitudes, and needs of integrating science (Conroy & Walker,

2000; Layfield, Minor & Waldvogel, 2001; Newman & Johnson, 1993; Thompson & Schumacher, 1998; Warnick & Thompson, 2007;) math (Miller & Gliem, 1993; Jansen, Enochs, & Thompson, 2006) and reading (Park & Osborne, 2006).

The theoretical model for this study consisted of the perceptions of the National Agriscience Teacher Ambassador Academy Ambassadors towards integrating academics. The theoretical base is grounded in the Theory of Predicted Behavior developed by Fishbein in 1967, and the Theory of Planned Behavior by Fishbein and Ajzen in 1975. These theories suggest that beliefs and behavior intentions can best be viewed as consequences of attitude and that knowledge influences values and beliefs which in turn affect attitudes, intentions and behaviors. These theories impact the study of teachers' perceptions to integrate academics into the agricultural education curriculum. Norris and Briers (1989, p.42) stated "teachers' perceptions toward the change process is the single best predictor of the teacher's…decision concerning adoption of the change."

Purpose and Objective

The purpose of this study was to develop a consensus listing of actions that should be completed to move agricultural education forward in the area of math, science, and reading integration. This purpose was operationalized by identifying the recommendations of expert teachers as to what steps should be completed by the profession to meet this goal. An expert panel of 26 teachers from 22 different states and U.S. territories was used to complete the objective of this study.

Methods/Procedures

Developed in the 1950s and 1960s by Dalkey and Helmer (1968), the Delphi method is a structured process to collect and distil knowledge from a group of experts on a particular topic or area (Ziglio, 1996). Linstone and Turoff (1975) identified several situations in which this technique of investigation would be most appropriate. Items on this list that are applicable in this situation are when "the problem does not lend itself to precise analytical techniques but can benefit from subjective judgments…" and "exposing priorities of …, social goals" (p.4).

This study employed the process outlined by Stitt-Gohdes and Crews (2004). This process was identified by Wilhelm (2001) as the conventional Delphi version. The first step of this process was the selection of the purposive sample to serve as the expert panel. For this study, the expert panel consisted of 26 teachers that had been selected to participate in the National Agriscience Teacher Ambassador Academy. Although a somewhat small sample, when using the Delphi technique the size of the expert panel will be variable and good results have been gathered with panels of no more than 10-15 individuals (Linstone & Turoff, 1975). Dalkey (1969) reported reliability greater than .80 when the Delphi group size was larger than 13 respondents.

Stufflebeam, McCormick, Binkerhoff, and Nelson (1985) noted the Delphi technique is especially effective in obtaining consensus among a purposively selected group of experts. In this instance the individuals who had the needed information (e.g., the "experts") were

considered to be teachers who had been identified by state agricultural education staff as leaders and innovators in this area and nominated to participate in this program. According to L. Gossen (personal communication, August 30, 2007), the teachers chosen to participate in the National Agriscience Teacher Academy were nominated or approved by their state supervisor for Agricultural Education. State supervisors were given the following criteria for their nomination/approval for teachers in their state: 1) their best agriscience teachers that were very familiar with science principles or teaching science-based classes, 2) have the respect of the teachers in their state as an excellent instructor, and 3) the commitment to make presentations at professional development meetings. Furthermore, Wicklein (1993) noted "the success of the Delphi relies on informed opinion," (p. 1050) not random selection.

The study consisted of a series of questionnaires, as is common for this technique (Moore, 1987). The first round of the study used a questionnaire with one open-ended question, "What should the agricultural education profession do to move forward in the area of math, science, and reading integration?" An open-ended question was used to facilitate the generation of a wide array of response categories. After initial responses were received, all were summarized and categorized by the researchers to produce items for a second round questionnaire.

In the second round of the study, Delphi panel members were asked to evaluate the statements and rate their level of agreement with the items identified in Round One. Panel members rated the items on a five-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, 5 = Strongly Agree). It was determined *a priori* that in order for an item to continue past the second round, it must have a mean score of 3.50 or greater on the 5-point scale.

The third questionnaire sought to determine consensus. As typical of Delphi studies, consensus was assumed to be reached when a certain percentage of respondents indicated agreement (Scheibe, Skutsch, & Shofer, 1975). This percentage was set *a priori* as 66%. Panel members were asked to indicate whether they agreed or disagreed with each of the recommendations, and to provide comments if they could not agree with the summary findings. Consensus was reached on all 34 items in this round. As noted by McCampbell and Stewart (1992), most Delphi studies reach consensus in the third round.

Data were analyzed using descriptive statistics. Ordinal data collected using Likert-type scales in the second round were treated as interval data and reported as means and standard deviations for classification purposes. Nominal data collected in the third round were reported using frequencies and percentages.

Findings

All participants in the study responded in each round (100% response rate). Thirty-five recommendations were identified by respondents in Round One. Recommendations identified

by more than two respondents are listed in Table 1. Many of the recommendations dealt with teacher professional development, curriculum and teaching materials, and policy/standards development.

Table 1

Round One: How should the profession move forward in the area of integration (n = 26)

Recommendation	Responses[a]
Teacher professional development focused on integration methods and techniques.	19
Include instruction on math, science, and reading integration in pre-service teacher programs.	11
Develop agriscience curriculum with embedded integration.	9
Align agriscience curriculum with state and national standards in math, science, and reading.	8
Integration lesson activities/tools/resources posted on website for easy access.	6
Require science courses in pre-service programs/certification requirements.	5
Obtain national "buy-in" on integration concept (philosophical switch).	5
Partner agriscience classes with math, science, and reading courses on cross-curricular projects.	3
Invite state/local education officials to local programs to see integration occurring.	3
Focus on early career and pre-service teacher professional development on integration methods.	3
Incorporate appropriate technology (iPods, PDAs)	3

[a] Recommendations identified by only one or two respondent are not included in this listing, but were included in Round Two.

Of the 35 items on the Round Two questionnaire, 34 were retained for the third round. Means for all items ranged from 4.68 to 3.40 (see Table 2). The highest level of agreement (M = 4.68) was reached on "develop agriscience curriculum with embedded integration." The next six highest rated statements provided recommendations dealing with pre-service teacher programs, teacher professional development, and national standards alignment.

The only item not retained for Round Three was "encourage agriscience teachers to obtain certifications in multiple areas" (M = 3.40). This level of agreement was below the *a priori* set level of agreement needed to be retained. As indicated by the high standard deviations for some items, much variability existed. Round Two standard deviations ranged from a low of 0.48 for "develop agriscience curriculum with embedded integration" (M = 4.68) to a high of 1.35 for "encourage agriscience teachers to obtain certifications in multiple areas" (M = 3.40). It may be interpreted as being influenced by the situations in each of the individual respondent's states.

Table 2

Round Two: Level of Agreement on Recommendations (n = 26)

Recommendation	*M*	*SD*
Develop agriscience curriculum with embedded integration.	4.68	.48
Include instruction on math, science, and reading integration in pre-service teacher programs.	4.64	.57
Stress the importance of professional development once teaching with pre-service teachers.	4.60	.50
Align agriscience curriculum with state and national standards in math, science, and reading.	4.60	.58
Teacher professional development focused on integration methods and techniques.	4.60	.58
Encourage and motivate agriscience teachers to integrate math, science, & reading.	4.52	.71
Require science courses in pre-service programs/certification requirements.	4.50	.51
Focus on early career and pre-service teacher professional development on integration methods.	4.42	.58
Increase number of open ended projects/laboratory activities.	4.40	.65
Publicize the NATAA.	4.40	.76
Acceptance of agriscience courses as science credit for admission to universities.	4.40	.91
Increase participation in the agriscience fair competition.	4.36	.70
Stress the importance of agriscience teachers being part of the total education community responsible to contribute to student learning. (standardized tests)	4.36	.70
Integration lesson activities/tools/resources posted on website for easy access.	4.36	.86
Publicize the agriscience fair program.	4.32	.69
Increase interaction between agriscience teachers and agriculture corporations.	4.32	.75
Include agriscience fair projects as part of agriscience courses.	4.32	.80
Utilize current events in curriculum.	4.32	.80
Federal legislation granting science credit for agriscience courses.	4.29	1.04
State legislation granting science credit for agriscience courses.	4.29	.96
Partner agriscience classes with math, science, and reading courses on cross-curricular projects.	4.24	.78
Increase laboratory time.	4.24	.83

(table continues)

Table 2 (continued)

Recommendation	*M*	*SD*
Invite state/local education officials to local programs to see integration occurring.	4.24	.92
Develop a CDE in agriscience.	4.21	1.06
Obtain national "buy-in" on integration concept (philosophical switch).	4.17	.87
Increase collaboration with math, science, and reading teachers.	4.16	.75
Include daily "bell work" targeting math, science, and reading standards	4.08	.83
Develop upper level high school agriscience courses focused on math, science and reading integration.	4.08	.96
Incorporate appropriate technology (computer based data collection, iPods, PDAs)	4.04	.98
Develop agriscience integration based textbooks.	4.04	1.06
Publicize scholarships based on integration activities.	4.04	1.06
Increase collaboration with math, science, and reading teacher organizations.	3.88	.93
Incorporate fiction and non-fiction publications into the curriculum.	3.88	.93
Formal assessment (standardized tests) of math, science, and reading concepts in agriscience courses.	3.68	1.07
Encourage agriscience teachers to obtain certifications in multiple areas.	3.40	1.35

In Round Three participants were asked to provide a dichotomous indication of whether they agreed or disagreed with each of the recommendations retained from Round Two. Panel members were also encouraged to provide comments if the recommendation could be further explained or modified to reach greater consensus.

All 34 recommendations included in Round Three obtained the *a priori* set level of agreement to be deemed a consensus (see Table 3). Panel members had 100% agreement on 11 of the recommendations. Those 11 items dealt with issues such as curriculum standard alignment, curriculum/lesson plan development and sharing, teacher professional development, and pre-service teacher programs.

Table 3

Round Three: Level of Agreement with Recommendations (n=26)

Recommendation	Agree %
Align agriscience curriculum with state and national standards in math, science, and reading.	100.0
Integration lesson activities/tools/resources posted on website for easy access.	100.0
Teacher professional development focused on integration methods and techniques.	100.0
Develop agriscience curriculum with embedded integration.	100.0
Encourage and motivate agriscience teachers to integrate math, science, & reading.	100.0
Stress the importance of professional development once teaching with pre-service teachers.	100.0
Publicize the agriscience fair program.	100.0
Publicize the NATAA.	100.0
Require science courses in pre-service programs/certification requirements.	100.0
Focus on early career and pre-service teacher professional development on integration methods.	100.0
Increase number of open ended projects/laboratory activities.	100.0
Include instruction on math, science, and reading integration in pre-service teacher programs.	96.2
Increase interaction between agriscience teachers and agriculture corporations.	96.2
Invite state/local education officials to local programs to see integration occurring.	96.2
Increase collaboration with math, science, and reading teachers.	96.2
Obtain national “buy-in” on integration concept (philosophical switch).	96.2
Develop upper level high school agriscience courses focused on math, science and reading integration.	96.2
Increase participation in the agriscience fair competition.	96.2
Stress the importance of agriscience teachers being part of the total education community responsible to contribute to student learning. (standardized tests)	96.0
State legislation granting science credit for agriscience courses.	92.3
Utilize current events in curriculum.	92.3
Incorporate appropriate technology (computer based data collection, iPods, PDAs)	92.3
Acceptance of agriscience courses as science credit for admission to universities.	92.3
Develop a CDE in agriscience.	88.5

(table continues)

Table 3 (continued)

Recommendation	Agree %
Increase laboratory time.	88.5
Publicize scholarships based on integration activities.	88.0
Federal legislation granting science credit for agriscience courses.	88.0
Incorporate fiction and non-fiction publications into the curriculum.	88.0
Include agriscience fair projects as part of agriscience courses.	88.0
Develop agriscience integration based textbooks.	84.6
Increase collaboration with math, science, and reading teacher organizations.	84.6
Partner agriscience classes with math, science, and reading courses on cross-curricular projects.	84.0
Include daily "bell work" targeting math, science, and reading standards	80.8
Formal assessment (standardized tests) of math, science, and reading concepts in agriscience courses.	73.1

Conclusions/Implications/Recommendations

The purpose of this study was to develop a list of actions to move agricultural education forward in the area of math, science, and reading integration. The conclusions and recommendations are based on the consensus of the 2007 National Agriscience Teacher Ambassadors. The researcher's categorized the conclusions/recommendations into concepts relating to curriculum, professional development, teacher preparation, philosophical, and collaboration.

Curriculum: Academically enhanced textbooks, integrated projects and laboratory activities, will provide resources to expand the program of study in agricultural education. The curriculum should be aligned with standards in math, science and reading, integrate cutting edge technology, utilize current events, and include advanced integrated courses. Additionally, a national website that includes lessons, activities and resources will provide added access for teachers. Developing assessment instruments that evaluate higher order thinking skills will help ascertain student achievement from an integrated curriculum.

The expansion of FFA Career Development Events related to agriscience will assist students in making the connection between agricultural and academic principles, while providing relevance to the curriculum. Marketing the agriscience fair competition at the national, state, and local levels will improve exposure and participation in these important events. It was noted that not all members of the expert panel were fully aware of the agriscience award programs coordinated through the National FFA Organization.

Professional Development: Professional development is paramount to moving the profession forward in integrating academics into agricultural education programs. Instruction in integrating math, science, and reading at the pre-service and in-service levels are professional growth functions that should be embraced at the national, regional, state, university, and local levels. Additional marketing and promoting professional development programs such as the National Agriscience Teacher Ambassador Academy will help agriculture teachers develop integrated approaches and techniques.

Teacher Preparation Programs: Teacher preparation programs can be a catalyst to helping the profession move forward in integrating academics. Stressing continual professional development to pre-service teachers is an important component to their professional growth. Teacher educators should investigate university science coursework that will help pre-service teachers enhance their knowledge to integrate science into the curriculum. Pedagogically, pre-service education should include teaching and modeling strategies on how to integrating academics into the curriculum.

Philosophical Shift: As a profession, agricultural educators need to create "buy-in" from the profession to integrate science, math, and reading into the curriculum. Philosophical transformation within the profession will help teachers, teacher educators, and department of education officials realize the role agriculture programs can play in increasing student achievement. Teachers need encouragement and assistance to develop collaborative efforts that will enhance academic learning within their programs.

Granting science credit has become an unresolved issue in agriscience education. The profession should lobby federal officials to grant science credit for agriscience courses (accepted at state universities) that truly integrate science. Agriculture teachers can help create "buy-in by inviting state and local education officials into the classroom to witness the advantage of integrated agriscience classes.

Collaboration: Collaboration efforts between academic and agriculture teachers will benefit students. Further, collaborative efforts should be forged between agriculture teacher and math, science, and reading teacher organizations. Collaboration with other academic teachers through cross-curricular projects will help students better understand the academic, as well as technical concepts and principles. These collaborative efforts will help agriculture teachers understand the importance and become stronger team members within the total educational community in developing the whole student. Additionally, more interaction between teachers and industry will benefit agriculture programs and students.

Further areas of research include: (a) examining exemplary programs that integrate science and agriculture may yield a model for integrating science (b) assessing the influence of integrating academics in the agricultural education curriculum on student achievement, and (c) identifying effective collaboration approaches for academic and agriculture teachers. To be most effective these investigations should be carried out by a coordinated team of researchers within the agricultural education profession. A vary of research designs and methods should be employed to gain a more complete understanding of this phenomenon and to develop models which my be generalized to the greater agricultural education community.

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EFFECTS OF MATH-ENHANCED CURRICULUM AND INSTRUCTIONAL APPROACH ON STUDENTS' ACHIEVEMENT IN MATHEMATICS: A YEAR-LONG EXPERIMENTAL STUDY IN AGRICULTURAL POWER AND TECHNOLOGY.

A Review

David L. Doerfert
Texas Tech University

The authors are to be commended for this study as well as for their work in preparing an exceptional manuscript that is a true pleasure to read. Few experimental designs are attempted within our profession and this study provides evidence to us all that it can be done and done well. The treatment in this study was the *Math-in-CTE* lesson development model as a guide to improve math-related instruction in their curriculum. The experimental group experienced this model as part of a professional development effort provided to the teacher over the course of this study. While a significant difference was not found between the two groups, student math achievement was higher for those in the experimental group. Consideration must be given to creating similar models that enhance our integration of academics efforts.

Of interest to this author and possibly the profession is the positive outcome discovered in the form of a community of practice that reportedly emerged from the study. Communities of practice (CoP) are informal groups that people form as they pursue shared enterprises or experiences over time. This social learning framework is relatively "new" for our profession's instructional and research efforts and, as such, raises more questions than answers. Many CoPs are face-to-face experiences and seldom are created by design. With that said, can we create an environment that is conducive to a CoP's emergence? If yes, what are the individual and group factors that lead to this development? What can we do as agricultural educators to nurture a CoP once it is formed?

Thanks to the authors for expanding our knowledge base on two separate instructional practices.

SELF-REPORTED LEVEL OF MATHEMATICS INTEGRATION OF OUTSTANDING VIRGINIA AGRICULTURAL EDUCATORS

A Review

David L. Doerfert
Texas Tech University

The integration of academic, vocational, and technical curriculum is a requirement for schools and states that receiving funding through the federal government's Carl D. Perkins Act. With this requirement likely to influence agricultural education into the foreseeable future, the initiative by these researchers to assess the current state of integration as well as teacher attitudes and perceptions toward this requirement are to be applauded.

The study used a purposely selected group of 26 teachers deemed to be outstanding by a panel of experts. The authors provided the criteria that were used for this selection however; several of the criteria were focused on the ability of the potential respondent to fully participate in this study versus on the teacher's performance within their local classroom or in the profession. As such, this author wonders if the outstanding agriculture teachers were truly chosen for this study.

The methods used in this study raise concern as to the validity of the findings. With most mandated requirements, there is a question of acceptance or buy-in of the requirement by those required to comply. When this integration requirement is coupled with the possibility of the loss of local funding through shortcomings or failures, those impacted may want to be seen in the "best of light." As such, self-reported data from these types of participants may be over inflated. This is typically known as social desirability response bias and can lower the validity of certain measures. The authors provided no evidence that this potential validity concern was addressed. In the future, researchers should consider additional steps and/or multiple data collection methods to ensure that this potential response bias is minimized.

While the initiative to explore this research question is to be lauded, the results of their efforts should be used with caution.

INTEGRATING ACADEMICS INTO AGRICULTURE PROGRAMS: A DELPHI STUDY TO DETERMINE PERCEPTIONS OF THE NATIONAL AGRISCIENCE TEACHER AMBASSADOR ACADEMY PARTICIPANTS

A Review

David L. Doerfert
Texas Tech University

Through this well-written manuscript, the authors aptly share their findings related to the integration of academics into agriculture programs. The results illustrate the perceptions of 26 teachers who participated in the 2007 National Agriscience Teacher Ambassador Academy. For the unaware, National Agriscience Teacher Ambassador Academy is sponsored by DuPont and supported by Lab-Aids as a special project of the National Future Farmers of America (FFA) Foundation. The Academy is a professional development program where agriculture teachers learn new inquiry-based teaching techniques to improve science learning which is reflected by improved performance in standardized science test scores of the students. The participants apply to be a part of the academy.

Herein lays the limitation of this study in that this small group of participants for this study may not be representative of the typical agriscience teacher across our country. Their motivation to apply to be part of the academy, whether intrinsic or extrinsic, may have a relationship to their perceptions of integrating academics.

Having said that, a strength of this study is the procedure used in the third round of the Delphi to identify the eleven perceptions that are shared by everyone (100%) in the group. While all 34 recommendations warrant further study, I would encourage the authors and other researchers to more closely examine the merits of the 11 recommendations that received unanimous support. Focusing our attention on the recommendations of these potential innovators (or at least early adopters) is worthy of our time and attention in advancing this important issue.

RESEARCH THEMES, AUTHORS, AND METHODOLOGIES IN THE *JOURNAL OF AGRICULTURAL EDUCATION*: A TEN YEAR LOOK

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Abstract

The Journal of Agricultural Education *(JAE) has been one of the primary outlets of agricultural education publishing and research and activity dissemination. The purpose of this study, which was a part of a larger study, was to assess ten years of JAE to determine primary and secondary research theme areas, frequent primary and secondary research themes by year, prolific authorship, and research methods and types used in research. The research used a field study to determine premier journal outlets in agricultural education and to focus research theme areas used in the study. The* Journal of Agricultural Education *(JAE) was identified by 93% of the field participants as a premier agricultural education journal. JAE was analyzed using all research articles published in the journal, from 1997 through 2006; this consisted of 323 articles. There were 39 primary research theme areas identified, with teacher preparation and competence (10.2%) being the most frequently identified. There were 37 secondary research theme areas identified, with teacher preparation and competence (11.8%) being the most frequently identified. The primary research theme with the highest frequency by year was teacher preparation and competence in 2006 (23.8%). The secondary research theme with the highest frequency by year was teacher preparation and competence in 2006 (21.4%). There were 751 JAE authors identified, with James Dyer (9.0%) being the most prolific. Quantitative research methods were the most common (80.5%). The most frequent research method types were survey methods (45.5%). Research themes appear cyclic and additional research must be completed to determine the depth and research influence of the potential cycles. Future research should continue to determine the level and degree of cycles and whether or not these cycles affect the discipline. Researchers must diversify their methodological research types to go beyond survey research.*

Introduction

Agricultural education contributes scholarship to agricultural and educational systems by linking technical areas of agriculture and humanistic dimensions (Barrick, 1989). It has been difficult to determine the impact of agricultural education, and it is equally difficult to see its future potential (Williams, 1991). In 1987, the North Central Association of State Agricultural Experiment Station Directors expanded its social science area with the acceptance of agricultural education as a discipline (NCA-24 Committee).

With recognition of agricultural education as a discipline, researchers have sought to understand the theoretical and conceptual underpinnings within its context, and numerous attempts have been made to focus the discipline. These attempts have typically focused on three main objectives: (a) analyzing the dimensions of agricultural education, (b) summarizing critiques of agricultural education research, and (c) suggesting strategies to focus the discipline (Barrick, 1989); more recently, the scope has expanded to include (d) summarizing prolific authors (Harder & Roberts, 2006; Radhakrishna & Jackson, 1995; Radhakrishna, Jackson, & Eaton, 1992). Newcomb (1993) indicated the need to transform university agricultural education

programs; he encouraged universities to broaden programs and to define programs of inquiry. In 1990, agricultural education researchers were encouraged to "develop an improved conceptual framework for future investigators" and "integrate existing work" (Birkenholz, Harbstreit, & Law, 1990, p. 32).

Although there have been few specific calls from the discipline to examine its very essence, numerous scholars have expounded on disciplinary typology (Baker, Briers, & Shinn, 2007; Barrick, 1989; Buriak & Shinn, 1989, 1993; Crunkilton, 1988; Dyer, Haase-Wittler, & Washburn, 2003; Frick, Kahler, & Miller, 1991; Hamlin, 1966; Harder & Roberts, 2006; Knight, 1984; Kotrlik, Barlett, Higgins, & Williams, 2001, 2002; Love, 1978; Mannebach, 1981; Mannebach, McKenna, & Pfau, 1984; McCracken, 1983; McKinney, 1987; Miller, 2006; Miller, Stewart, & West, 2006; Moore, 1991, 2006; Moss, 1986; Radhakrishna, 1995; Radhakrishna, Eaton, Conroy, & Jackson, 1994; Radhakrishna & Jackson, 1992, 1993, 1995; Radhakrishna & Mbaga, 1995; Radhakrishna & Xu, 1997; Shinn, 1994; Silva-Guerrero & Sutphin, 1990; Warmbrod, 1986, 1987; Warmbrod & Phipps, 1966). However, the review of literature failed to identify a holistic approach to examining research in the discipline. It is essential to examine critical components of agricultural education research to understand the current state of research and take a more futuristic approach to knowledge pursuit, development, and examination.

"The future of agricultural research depends upon many variables, not the least important of which is acquisition and application of new knowledge generated from research" (Dyer, Hasse-Wittler, & Washburn, 2003, p. 61). Moore (2006) posited that it is clear that agricultural educators are not "driving" the profession and they spend their time "dabbling in esoteric research that doesn't have much relevance to the real world" (p. 1). Concerns have been voiced about whether future agricultural education is actively engaged in research that is needed, progressive, and rigorous.

Since the 1990s, a rapid growth in research and publishing activities in the agricultural education profession has resulted in enormous growth of agricultural literature (Radhakrishna & Jackson, 1995) and new research outlets were created. "Given the institutional demands of research, teaching, extension, and service, faculty often must allow one area to suffer to meet the expectations of another" (Myers & Dyer, 2004). If research suffers then every aspect of the agricultural education discipline suffers with it.

The need for this research is grounded in research by Ball and Knobloch (2005); Baker, Briers, and Shinn (2007); Crunkilton (1988); Knight (1984); Miller, Stewart, and West (2006); Newcomb (1993); and Radhakrishna and Xu (1997). Knight (1984) wrote that a discipline's journals and magazines are good indicators of research priorities in the discipline. Radhakrishna and Xu (1997) found that research journal articles are indicators of the profession's scientific activity, philosophy, and application. Ball and Knobloch (2005) indicated that it is critical for practitioners to examine the knowledge base of the field to allow the profession to reflect upon actions and ultimately improve the discipline. Crunkilton (1988) identified the need for agricultural education to know where it can and should go with research in its pursuit to develop empirical knowledge. Newcomb (1993) called for agricultural education research to become more focused, coordinated, and conducted passionately. Miller, Stewart, and West (2006) identified the need to review literature and track citations to maintain a clear sense of the

discipline's research agenda. Baker, Briers, and Shinn (2007) indicated the need to examine core knowledge objects and knowledge domains. The expressed need to focus the agricultural education discipline, examine its knowledge base, and review its literature creates a call for the employment of a holistic approach to examine research in agricultural education.

There have been few specific calls in agricultural education to examine the very essence of its research. Yet there is a need to understand where the discipline has been to allow the profession to better understand where to focus research efforts in the future. "There is a need to re-examine agricultural education in a future that has already happened. Has the knowledge changed along with the times?" (Baker, Shinn, & Briers, 2007, p. 1). Baker, Shinn, and Briers indicated a need to examine core knowledge objects and collective knowledge domains for agricultural education, and this need remains. There is a need, as illustrated by research, to analyze the dimensions of agricultural education in a holistic manner and suggest strategies to focus the discipline and prepare it for the future.

In the past, agricultural education has used a fragmented approach to examining its research. By holistically examining the critical components of agricultural education research, the discipline can deepen its understanding of the current state of research and take a more futuristic approach to knowledge pursuit, development, and examination. The agricultural education disciple might examine many components: research theme areas, variety in research theme areas by year, prolifically published authors, and types of research being conducted. Research can analyze the dimensions of agricultural education in the *Journal of Agricultural Education*. Understanding these areas will assist the discipline to more fully focus literary contexts and further strengthen the discipline. This study will assist in the creation of a discipline baseline in determining the experience-base of research occurring in agricultural education.

Theoretical and Conceptual Framework

The 1990s was a time of rapid growth in research and publishing activities in agricultural education; this resulted in enormous growth of agricultural literature (Radhakrishna & Jackson, 1995; Sax, Astin, Korn, & Gilmartin, 1999). The future of agricultural education depends on many variables and application and acquisition of new knowledge via research is extremely important (Dyer, Haase-Wittler, & Washburn, 2003).Yet, the quality of research has been questioned for more than two and a half decades, and in some cases has been identified as inferior to other disciplines (Buriak & Shinn, 1993; Dyer, Haase-Wittler, & Washburn, 2003; Radhakrishna & Xu, 1997; Silva-Guerrero & Sutphin, 1990; Warmbrod, 1986).

The conceptual framework of the study (Figure 1) was grounded in work by numerous scholars in agricultural education. The study analyzed research articles published in the *Journal of Agricultural Education*. Several researchers have completed various components of journal analysis in agricultural education: familiarity and quality of journals and importance of faculty publishing (Radhakrishna, 1995; Radhakrishna & Jackson, 1993); research theme areas (Buriak & Shinn, 1993; Dyer, Haase-Wittler, & Washburn, 2003; Miller, Stewart, & West, 2006; Moore, 1991; Radhakrishna & Xu, 1997; Silva-Guerrero & Sutphin, 1990); prolific authors (Harder & Roberts, 2006; Radhakrishna & Jackson, 1995; Radhakrishna, Jackson, & Eaton, 1992); and statistical methods used (Bowen, Rollins, Baggett, & Miller, 1990; Dyer, Haase-Wittler, & Washburn, 2003; Mannenbach, McKenna, & Pfau, 1984).

This study examined all research articles published in *JAE* from 1997 to 2006. The study assessed primary and secondary research theme areas, authorship, and research methods and types using a content analysis approach. This research is the first step in identifying a research experience-base framework for agricultural education in the subfields of agricultural education (Crunkilton, 1988). Conceptually, this research examined agricultural education with respect to five identified subfields of teacher education, extension education, agricultural communications, international agricultural education, and leadership education by analyzing scholarship in published *JAE* research articles. The examination included research themes, authorship, and research methods by use of a content analysis to create an experience-base of research occurring in agricultural education. This experience-base can then be used as a framework to suggest future research strategies.

CONCEPTUAL MODEL

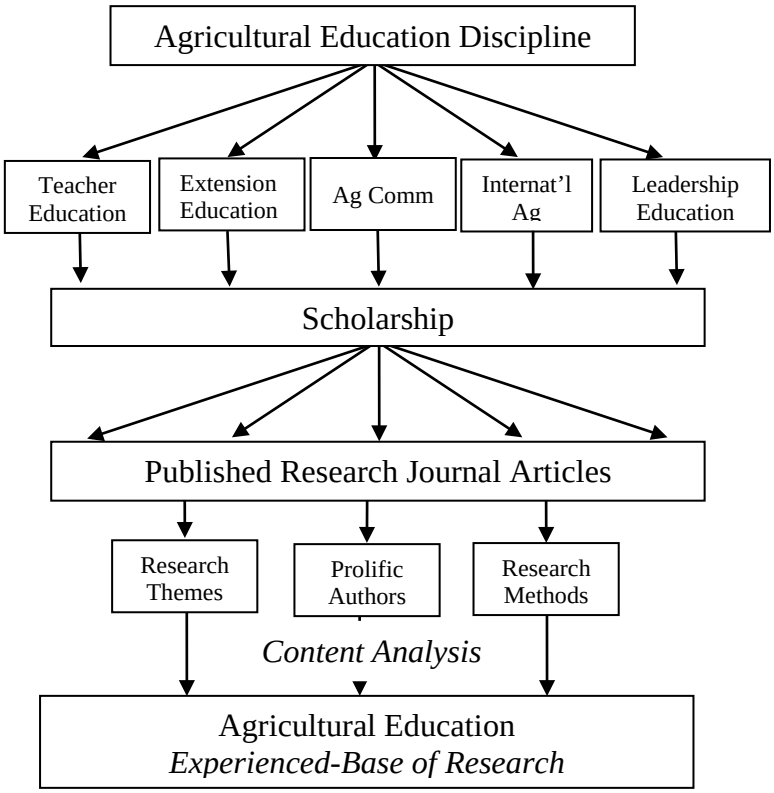

Figure 1. Conceptual base of the study.

Purpose and Objectives

The purposes of this study, which was a part of a larger study, were to review research published in the *Journal of Agricultural Education* from 1997 to 2006 and to examine the status of the journal to provide a base from which to direct future research. The specific objective was to describe and synthesize published research in the *JAE* from 1997 to 2006 by (a) identifying primary and secondary research themes in published research articles; (b) identifying primary

and secondary research theme areas among research articles published by year; (c) identify the most prolific authors; and (d) identify research methods and designs.

Research Methods and Procedures

This study employed a mixed-methods content analysis design. Content analysis as a research method has existed for decades, and the best content-analytic studies use both qualitative and quantitative operations (Weber, 1990). Content analysis can be used to give researchers insight into problems or hypotheses that can then be tested by more direct methods. Content analysis is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Berelson, 1952; Krippendorf, 1980; Weber, 1990).

Face and content validity were maintained using previous research as a guide and a field study to focus the research. One hundred four individuals were identified as active agricultural education research authors based on a Delphi study by Baker, Shinn, and Briers (2007). Eight individuals were eliminated after failed attempts to identify usable email addresses. A field questionnaire was developed and sent to those authors with valid email addresses. These individuals were to identify premier journals and to add validity to research theme categories. Research theme categories were created based on previous content analyses of journals in agricultural education. These categories were provided to the pilot study, and it was their responsibility to compress or expound on research theme areas. The pilot study identified thirty-seven research theme areas.

Dillman's Tailored Design Method was implemented (Dillman, 2000), and 62 of 94 possible respondents completed the questionnaire; a 66% response rate. Sixteen of the 62 field questionnaires were returned blank or partially completed and represented non-useable responses. Non-response error was controlled by comparing early to late respondents (Lindner, Murphy, & Briers, 2001). T-tests indicated no significant differences between the early and late respondents.

Research journal articles from 1997 to 2006, in the identified premier agricultural education journal (i.e., *Journal of Agricultural Education*), were used as the frame for the study. The researcher and an assistant independently reviewed the material and formed a checklist of information required during the review of each journal article. The researchers compared notes and reconciled differences emerging on their initial checklists via negotiations. Researchers used a consolidated checklist to independently apply coding. The researchers then checked for agreement in coding; if reliability was not acceptable, then the previous steps were repeated. Once reliability had been established, the coding was applied on a large-scale basis. The final stage was a periodic quality control check (Weber, 1990). Inter-coder reliability of coding was completed independently, with at least 10% overlap for the reliability test. Final reliability was calculated using a random sample of 5% of the analyzed articles. Reliability was assessed using Spearman's rho for each variable. Reliabilities met or exceeded the minimum standard of .70.

The study content analysis identified ninety-one research theme categories. A panel of research experts was used to independently review and then compile, compress, and collapse research theme areas. After the independent review, researchers checked for agreement on research theme areas and adjusted research theme areas based on negotiations. This study is part

of a larger study that recognized fifty research theme areas in agricultural education research during the ten-year assessment.

Findings

The *Journal of Agricultural Education* (*JAE*) was identified in the field study as the premier agricultural education research journal; 93% of respondents indicated that the *JAE* was a premier journal in the agricultural education discipline. All research journal articles (n=323 articles) published from 1997 to 2006 were analyzed.

Primary research themes identified in the *JAE* are shown in Table 1. There were 39 primary research themes identified in *JAE* in the 10-year content analysis. The most frequently identified primary research theme was teacher preparation and competence (10.2%). The second most frequent primary research theme was needs assessment, identified in 9.0% of the *JAE* research articles. Perceptions and attitudes assessment was identified as the third most frequently used primary research theme (6.5%). Primary research theme areas identified, in *JAE* research articles, 6.2% or less are identified in the following table.

Table 1
Primary Research Themes Identified in the Journal of Agricultural Education 1997–2006 (*N = 323; 39 primary research themes)*

Research Theme	*f*	*P*
Teacher Preparation & Competence	33	10.2
Needs Assessment	29	9.0
Perceptions & Attitudes Assessment	21	6.5
Food, Agriculture, Natural Resources, Health, & Family	20	6.2
Research (methods and models)	17	5.3
Academic Programs	12	3.7
Critical Thinking	12	3.7
Distance Education	12	3.7
Evaluation	12	3.7
Instructional & Program Delivery Approaches	12	3.7
Processes, Principles, & Styles of Learning	12	3.7
Youth Leadership & Development	12	3.7
Appropriateness of Education	10	3.1
Leadership Management	10	3.1
Institutional Organization and Institutionalization	8	2.5
Curriculum & Program Development	7	2.2
Professional Development	7	2.2
Service & Experiential Learning	7	2.2
Diversity (culture, ethnicity, gender)	6	1.9
Knowledge Competencies & Development	6	1.9
Leadership Development	6	1.9
Volunteer Development & Leadership	6	1.9
Career Development & Assessment	5	1.5
Leadership Education	5	1.5
Agriculture Literacy	4	1.2
Communication Management	4	1.2

Table 1 (continued)

Research Theme	*f*	*P*
Formal & Informal Teaching Approaches	4	1.2
Skill Development & Competencies	4	1.2
Communication Technology	3	0.9
Policy Issues	3	0.9
Communications of Scholarship	2	0.6
Globalization & Internationalization	2	0.6
Information Sources &Technology	2	0.6
Organizational Development & Leadership	2	0.6
Writing	2	0.6
Diffusion of Innovations	1	0.3
Marketing & Promotion	1	0.3
Media Relations	1	0.3
Quality of Life & Life Skills	1	0.3

Secondary research themes identified in the *Journal of Agricultural Education* are displayed in Table 2. There were 37 secondary research theme areas identified. The most frequently identified secondary research theme was teacher preparation and competence (11.8%). The second most frequent secondary research theme was food, agriculture, natural resources, health, and family, identified in 6.5% of the research articles. Curriculum and program development was the third most frequently identified secondary research theme (6.2%). Secondary research theme areas identified 5.6% or less are identified in the table below.

Table 2
Secondary Research Themes Identified in the Journal of Agricultural Education 1997–2006 (N = 323, 37 secondary research themes)

Research Theme	*f*	*P*
Teacher Preparation & Competence	38	11.8
Food, Agriculture, Natural Resources, Health, & Family	21	6.5
Curriculum & Program Development	20	6.2
Distance Education	18	5.6
Evaluation	18	5.6
Formal & Informal Teaching Approaches	17	5.3
Institutional Organization & Institutionalization	17	5.3
Youth Leadership & Development	17	5.3
Instructional & Program Delivery Approaches	16	5.0
Appropriateness of Education	15	4.6
Academic Programs	12	3.7
Processes, Principles, & Styles of Learning	12	3.7
Diversity (culture, ethnicity, gender)	9	2.8

Table 2 (continued)

Research Theme	*f*	*P*
Perceptions & Attitudes Assessment	9	2.8
Professional Development	9	2.8
Needs Assessment	8	2.5
Leadership Management	7	2.2
Research (methods and models)	6	1.9
Communications of Scholarship	5	1.5
Leadership Education	5	1.5
Volunteer Development & Leadership	5	1.5
Career Development & Assessment	4	1.2
Critical Thinking	4	1.2
Knowledge Competencies & Development	4	1.2
Leadership Development	4	1.2
Quality of Life & Life Skills	4	1.2
Skills, Knowledge, & Competencies	4	1.2
Community Development & Leadership	3	0.9
Accountability	2	0.6
Information Sources & Technology	2	0.6
Media Relations	2	0.6
Collaborations, Partnerships, & Coalitions	1	0.3
Consumer/Audience Response & Analysis	1	0.3
Globalization & Internationalization	1	0.3
Marketing & Promotion	1	0.3
Policy Issues	1	0.3
Service & Experiential Learning	1	0.3

Table 3 shows the most frequently-occurring primary research themes by year. In 1997, needs assessment was the most frequently identified primary research theme, 20.7% (6 of 29 articles). In 1998, the most common primary research theme was again needs assessment, 15.4% (4 of 26 articles). In 1999, needs assessment was the most frequently used primary research theme at 23.3% (7 of 30 articles). In 2000, the most frequent primary research theme was food, agriculture, natural resources, health, and family, 14.0% (6 out of 43 articles). In 2001, the most frequent primary research theme was perceptions and attitudes assessment, 14.8% (4 of 27 articles). In 2002, the most frequently used primary research themes was teacher preparation and competence, 10.7% (3 of 28 articles). In 2003, the most frequent primary research theme was again teacher preparation and competence, 12.9% (4 of 31 articles). In 2004, teacher preparation and competence was the primary research theme identified 11.8% (4 of 34 articles). In 2005, the most used primary research theme was again teacher preparation and competence, 18.2% (6 of 33 articles). In 2006, teacher preparation and competence was the most frequently identified primary research theme, 23.8% (10 of 42 articles).

Table 3
Most Common Primary Research Themes in the Journal of Agricultural Education by Year (*N = 323)*

Year	Primary Research Theme	*n*	*f*	*P*
1997	Needs Assessment	29	6	20.7
1998	Needs Assessment	26	4	15.4
1999	Needs Assessment	30	7	23.3
2000	Food, Agriculture, Natural Resources, Health, and Family	43	5	11.6
2001	Perceptions and Attitudes Assessment	27	4	14.8
2002	Teacher Preparation and Competence	28	3	10.7
2003	Teacher Preparation and Competence	31	4	12.9
2004	Teacher Preparation and Competence	34	4	11.8
2005	Teacher Preparation and Competence	33	6	18.2
2006	Teacher Preparation and Competence	42	10	23.8

Table 4 outlines the frequently used secondary research themes identified in the *Journal of Agricultural Education* by year. In 1997, youth leadership and development was the most frequently used secondary research theme, 13.8% (4 out of 29 articles). In 1998, there were four secondary research themes, identified 11.5%, appropriateness of education, distance education, diversity (ethnicity, gender, culture), and evaluation (3 out of 26 articles). In 1999, the most frequently identified secondary research theme was perceptions and attitudes assessment, 13.3% (4 out of 30 articles). In 2000, the most frequently used secondary research theme was teacher preparation and competence used 18.6% (8 out of 43 articles). In 2001, there were two secondary research theme areas identified, food, agriculture, natural resources, health, and family and institutional organization and institutionalization 11.1% (3 out of 27 articles). In 2002, teacher preparation and competence was the most frequently identified secondary research theme, 14.3% (4 out of 28 articles). In 2003, the most frequent secondary research theme was again teacher preparation and competence, 16.1% (5 out of 31 articles). In 2004, institutional organization and institutionalization was the most frequent secondary research themes, 11.8% (4 out of 34 articles). In 2005, there were three secondary research themes identified as the most frequently used, they are distance education, institutional organization and institutionalization, and teacher preparation and competence, 12.1% (4 out of 33 articles). In 2006, teacher preparation and competence was the most frequently identified secondary research theme area, 21.4% (9 out of 42 articles).

Table 4
Most Identified Secondary Research Themes in the Journal of Agricultural Education by Year (N = 323)

Year	Secondary Research Theme	*n*	*f*	*P*
1997	Youth Leadership and Development	29	4	13.8
1998	Appropriateness of Education (4-way tie)			
	Distance Education			
	Diversity (ethnicity, gender, culture)			
	Evaluation	26	3	11.5
1999	Perceptions and Attitudes Assessment	30	4	13.3
2000	Teacher Preparation and Competence	43	8	18.6
2001	Food, Agriculture, Natural Resources, Health, and Family			
	Institutional Organization and Institutionalization	27	3	11.1
2002	Teacher Preparation and Competence	28	4	14.3
2003	Teacher Preparation and Competence	31	5	16.1
2004	Institutional Organization and Institutionalization	34	4	11.8
2005	Distance Education (3-way tie)			
	Institutional Organization and Institutionalization			
	Teacher Preparation and Competence	33	4	12.1
2006	Teacher Preparation and Competence	42	9	21.4

The prolific authors identified in the *Journal of Agricultural Education* are identified in Table 5. There were 751 authors (duplicated count) identified in the 323 analyzed *JAE* articles. James Dyer was the most prolific author in the journal, authoring or co-authoring 29 of the 323 articles (9.0%). Greg Miller was the second most prolific author in *JAE* authoring or co-authoring 5.9% of the total articles. James Lindner and Rick Rudd were the third most prolific authors, authoring or co-authoring 3.7% of the total published articles. Additional prolific *JAE* authors are identified in the following table.

Table 5
Prolific Authorship in the Journal of Agricultural Education 1997 – 2006 (N of Authors = 751; N of Total Articles = 323)

JAE Author	*f*	*P* of Authors	*P* of Total Articles
Dyer, James E.	29	3.9	9.0
Miller, Greg	19	2.5	5.9
Lindner, James R.	12	1.6	3.7
Rudd, Rick D.	12	1.6	3.7
Williams, David L.	11	1.5	3.4
Roberts, T. Grady	10	1.3	3.1
Ball, Anna L.	9	1.2	2.8
Balschweid, Mark A.	9	1.2	2.8
Edwards, M. Craig	9	1.2	2.8

Table 5 (continued)

JAE Author	*f*	*P* of Authors	*P* of Total Articles
Garton, Bryan L.	9	1.2	2.8
Thompson, Gregory W.	9	1.2	2.8
Briers, Gary E.	8	1.1	2.5
Knobloch, Neil A.	8	1.1	2.5
Johnson, Donald M.	8	1.1	2.5
Murphy, Tim H.	8	1.1	2.5
Osborne, Edward W.	8	1.1	2.5
Wingenbach, Gary J.	8	1.1	2.5
Conroy, Carol A.	7	0.9	2.2
Dooley, Kim E.	7	0.9	2.2
Kelsey, Kathleen D.	7	0.9	2.2
Myers, Brian E.	7	0.9	2.2
Talbert, B. Allen	7	0.9	2.2
Trexler, Cary J.	7	0.9	2.2
Connors, James J.	6	0.8	1.9
Cano, Jamie	6	0.8	1.9
Gamon, Julia A.	6	0.8	1.9
Gartin, Stacy A.	6	0.8	1.9
Shih, Ching-Chun	6	0.8	1.9
Torres, Robert M.	6	0.8	1.9

Research methods used in the *Journal of Agricultural Education* are identified in Table 6. Quantitative research methods were the most common (80.5%), followed by qualitative (11.1%); the least often used research methods were mixed or qualitative and quantitative methods (8.4%).

Table 6
Research Methods Used in the Journal of Agricultural Education 1997 – 2006 (N = 323)

Method	*f*	*P*
Quantitative	260	80.5
Qualitative	36	11.1
Mixed Methods	27	8.4

Research designs used in the 323 articles published in the *Journal of Agricultural Education* are outlined in Table 7. Surveys were the most frequent research design used (45.5%). Correlation research designs were used in 10.5% of the published research. The third most common research design was experimental research identified in 8.7% of the *JAE* articles. Historical research comprised 7.7% of the *JAE* studies. Delphi methods were identified in 5.9% of the research. An ex post facto design was used in 12 of the 323 articles (3.7%). Additional research designs and procedures, in *JAE* research articles, are described in the following table.

Table 7
Research Design Used in the Journal of Agricultural Education 1997 – 2006 (N = 323)

Design	*f*	*P*
Survey	147	45.5
Correlation	34	10.5
Experimental	28	8.7
Historical	25	7.7
Delphi	19	5.9
Ex Post Facto	12	3.7
Case Study	9	2.8
Content Analysis	9	2.8
Interviews	9	2.8
Evaluation	8	2.5
Other designs	23	7.1

Conclusions

The *Journal of Agricultural Education (JAE)* was identified as the premier journal in agricultural education. Then, in articles published, variety in research theme areas was seen. Research in the journal is adding to the scope and topography of the agricultural education discipline. Research theme topics were cyclic with research themes moving between primary and secondary and themes moving out of primary and secondary for a time before cycling back in. The results indicated what the discipline values in terms of research priorities. Numerous researchers add to the scope of the discipline; no author or authors dominated *JAE*. *JAE* is a research journal with authors who are faculty; it is not a practitioner-based outlet. Quantitative survey methodologies were most prevalent in research in the discipline. Based on research methods and designs, agricultural education lacks research methodological diversity and scope.

Discussion and Implications

In 1993, Newcomb identified the need to transform university agricultural education programs and encouraged universities to broaden programs by offering leadership programs, extension education, agricultural communications, and international development, and to add depth to teacher education programs. The 1990s was a time of rapid growth in research and publishing activities in agricultural education; this resulted in enormous growth of agricultural literature (Radhakrishna & Jackson, 1995; Sax, Astin, Korn, & Gilmartin, 1999). Since that time programs and research have shifted and publication outlets have increased. It is critical that agricultural education have a clear picture of past research priorities and strategies to allow the discipline to continue to improve its research. This research attempted to outline research priorities, strategies, and designed used during the past ten years and this paper calls for additional research adjustments.

Baker, Shinn, and Briers (2007) issued a specific call to examine the knowledge domains of agricultural education. This study identified variety in research theme areas in published agricultural education research. Agricultural education research may reflect a broader view as it examines elements of various knowledge domains. Furthermore, numerous researchers add to the scope and topography of the discipline; no author or authors dominated the discipline.

Because researchers bring with them a variety of interests in both research topics and strategies, this finding is an important component in research diversity.

Knight (1984) and Radhakrishna and Xu (1997) indicated that published research journal articles are indicators of the profession's current state. Although this research supports Knight and Radhakrishna and Xu, it also provides a note of caution and an evident need for more variety in research methodology and design in the discipline. If research occurring over the past 10 years is indicative of all research in the discipline, there is a clear need to focus research themes while improving methodological research strategies beyond survey research. There has been criticism regarding research rigor and diversity in the discipline. The findings of this study indicate that a majority of research occurring in agricultural education is survey research. There is a need to engage in more rigorous research methodologies to answer the "why" rather than the "what is."

Recommendations

The profession must continue to reflect upon those actions and ultimately improve the discipline. This study must be one of many future studies to examine the essence of the discipline. Reflections regarding efforts to improve and diversify the discipline must continue. Additional research must be completed to expand the research themes identified in this study. Broader research themes would assist agricultural education in determining how agricultural education research is incorporated into other disciplines and research initiatives. There also appears to be a pattern in the primary and secondary research themes identified in this study. Further research must be completed to determine the degrees of research theme cycles, meaningfulness of cycles, and how cycles affect the discipline. Agricultural education researchers must diversify their methodological research portfolios to include variety in research types. Additional research must be completed to determine the depth of survey methodological rigor. Research must continue to determine whether current research methodologies are serving the discipline to maintain progressiveness. Further research must be completed to provide methods and standards for exceptional and rigorous research in agricultural education.

Current agricultural education research (experience-base) must be compared to future research priority areas. By using a benchmark, such as the *National Research Agenda: Agricultural Education and Communication 2007 – 2010* (2007), agricultural education can better determine if past research is supporting futurist research priority areas, and determine where adjustments must be made.

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RESEARCH THEMES IN AGRICULTURAL EDUCATION: FUTURE GAP ANALYSIS OF THE NATIONAL RESEARCH AGENDA

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Abstract

The field of agricultural education relies on multiple research journals to disseminate findings. This study focused on a 10-year content analysis of research published in agricultural education (AGED) journals identified as premier. The purpose of the study, which was a part of a larger study, was to ascertain primary and secondary research theme areas in premier agricultural education journals from 1997 to 2006 and compare those themes to the National Research Agenda (NRA): Agricultural Education and Communications 2007-2010. The study sought assistance from prolific agricultural educators to identify premier agricultural education journals, to identify and focus research theme areas, and to ensure study content validity. This study employed a mixed-method content analysis design with gap analysis. There were six premier research journals in agricultural education examined in the study. There were 49 primary and 49 secondary research theme areas identified in the premier AGED journals. The most frequently identified primary research theme was food, agriculture, natural resources, health, and family (14.16%). This theme was also the most frequently identified secondary research theme (11.12%). The researchers used compiled research theme data from each of the premier research journals, to analyze frequencies and gaps in the NRA. There are 5 context areas listed in the NRA. Agricultural education in domestic and international settings: extension and outreach was identified as the most researched contextual area in agricultural education. Of the 22 research priority areas identified in the NRA, RPA 9 (ascertain the public's knowledge, views, and openness regarding the agri-food and natural resource system) was the most frequently researched priority area (26.2%). There were no gaps identified in the NRA, which indicated that there are no futuristic research priority areas identified for the discipline. To continue to strengthen the agricultural education discipline, research from this study must be used to adjust research priority areas in the NRA.

Introduction

Agricultural education contributes scholarship to agricultural and educational systems by linking technical areas of agriculture and the humanistic dimensions (Barrick, 1989). In the past, it has been difficult to appraise the impact of agricultural education, and it is equally difficult to perceive its potential (Williams, 1991). With recognition of agricultural education as a discipline, research has sought to further understand the theoretical and conceptual underpinnings of agricultural education in its context, and numerous attempts have been made to focus the discipline (Barrick, 1989).

Newcomb (1993) identified the need to transform university agricultural education programs and encouraged programs to embrace a different approach to research to include a defined program of inquiry. Although there have been few specific calls from the discipline to examine its very essence, numerous scholars have expounded on disciplinary topology (Baker, Shinn, & Briers, 2007; Barrick, 1989; Buriak & Shinn, 1989, 1993; Crunkilton, 1988; Dyer, Haase-Wittler, & Washburn, 2003; Frick, Kahler, & Miller, 1991; Hamlin, 1966; Harder &

Roberts, 2006; Knight, 1984; Kotrlik, Barlett, Higgins, & Williams, 2001, 2002; Love, 1978; Mannebach, 1981; Mannebach, McKenna, & Pfau, 1984; McCracken, 1983; McKinney, 1987; Miller, 2006; Miller, Stewart, & West, 2006; Moore, 1991, 2006; Moss, 1986; Radhakrishna, 1995; Radhakrishna, Eaton, Conroy, & Jackson, 1994; Radhakrishna & Jackson, 1992, 1993, 1995; Radhakrishna & Mbaga, 1995; Radhakrishna & Xu, 1997; Shinn, 1994; Silva-Guerrero & Sutphin, 1990; Warmbrod, 1986, 1987; Warmbord & Phipps, 1966; Williams, 1991). However, the review of literature failed to identify a holistic approach to examining research in the discipline. It is essential to examine critical components of agricultural education research and suggest strategies to focus the discipline. By understanding the components of past research it is possible to understand the current state of research and take a more futuristic approach to knowledge pursuit, development, and stratagem.

"The future of agricultural research depends upon many variables, not the least important of which is acquisition and application of new knowledge generated from research" (Dyer, Hasse-Wittler, & Washburn, 2003, p. 61). Moore (2006) posited that it is clear that agricultural educators are not "driving" the profession and they spend their time "dabbling in esoteric research that doesn't have much relevance to the real world" (p. 1). Concerns have been voiced about whether future agricultural education is actively engaged in research that is both needed and futuristic.

Peter Drucker (1998) suggested:

> …in human affairs political, social, economic, and business, it is pointless to try to predict the future, let alone attempt to look ahead 75 years. But it is possible and fruitful to identify major events that have already happened, irrevocably, and that therefore will have predictable effects in the next decade or two. It is possible, in other words, to identify and prepare for the future that has already happened. (p. 16)

Scholarship varies in importance, need, content, superiority, and capacity; however, the research created in the discipline influences the future efforts of the field. Since the 1990s, a rapid growth in research and publishing activities in the agricultural education profession has resulted in enormous growth of agricultural literature (Radhakrishna & Jackson, 1995), and new research outlets were created. "Given the institutional demands of research, teaching, extension, and service, faculty often must allow one area to suffer to meet the expectations of another" (Myers & Dyer, 2004). If research suffers, then every aspect of the agricultural education discipline suffers with it.

Knight (1984) and Radhakrishna and Xu (1997) indicated that research journal articles are indicators of the profession's current state. Ball and Knobloch (2005) indicated that it is critical for practitioners to examine the research base of the practice to allow the profession to reflect upon those actions and ultimately improve the discipline. Miller, Stewart, and West (2006) identified the need to review literature and track citations to maintain a clear sense of the discipline's research agenda. Crunkilton (1988) identified the need for agricultural education to know where it can and should go with research in its pursuit to develop empirical knowledge. The expressed need to focus the agricultural education discipline, examine its research base, and

create a future framework creates a call for the completion of a holistic approach to examine research in the discipline and compare past research to a futuristic framework.

Theoretical and Conceptual Framework

The theoretical framework of this study lies in Boulding's (1956) general systems theory: "the skeleton of science that aims to provide a framework or structure of systems on which to hang the flesh and blood of particular disciplines and particular subject matters in an orderly and coherent corpus of knowledge" (p. 208). The theory is used to study all relationships abstracted from any body of empirical knowledge. In a sense, agricultural education corresponds to a specific segment of the empirical world, and the discipline develops theories that have applicability to its own empirical segment. Agricultural education creates certain elements of the experience of individuals and develops theories and patterns of research that provide understanding to its empirical knowledge.

Systems theory deals with epistemological processes underlying knowledge acquisition and allows algorithms to be developed for computer-based systems modeling (Gaines & Shaw, 1984). It is typically a part of positivistic research that can be used with gap analysis. "System theory can be used to analyze, logically, precisely and completely, the implications of a philosophical position" (Gaines, 1978, p. 13). Theoretically, this model (Figure 1) can assist agricultural education in establishing a system of past and futuristic research. The agricultural education context is based on research theories derived from the discipline. The general systems model works to develop theoretical models having applicability to two or more of the subfields in agricultural education (Gaines, 1978). General systems theory indicates that the agricultural education discipline is embedded in the agricultural and education contexts which encompass the subfield areas of teacher education, extension education, agricultural communications, international agricultural education, and leadership education.

The conceptual framework of the study was grounded in these subfield areas that support the context of agricultural education. These subfield areas have faculty involved in scholarship (research), and this scholarship influence research occurring in journal articles both inside and outside the discipline. This study was conceptually grounded in past research indicating that research theme areas are important in determining the current state of research (Buriak & Shinn, 1993; Dyer, Haase-Wittler, & Washburn, 2003; Miller, Stewart, & West, 2006; Moore, 1991; Radhakrishna & Xu, 1997; Silva-Guerrero & Sutphin, 1990). This past research frame becomes the experience-base of agricultural education research. The *National Research Agenda (NRA): Agricultural Education and Communication 2007-2010* (2007) was developed, in an effort, to outline future research priorities for the discipline. The *NRA* was used as a benchmark for the study. The *NRA* is the first holistic document outlining research priority areas in each of the subfield areas of agricultural education. The *NRA* was used to provide a benchmark for agricultural education research. Gap analysis was used to compare the experience-base (past research) to the benchmark (*NRA* priority areas) to determine the future state of agricultural education research. The use of gap analysis provided insight in to the research theme area frequencies and gaps represented in agricultural education research.

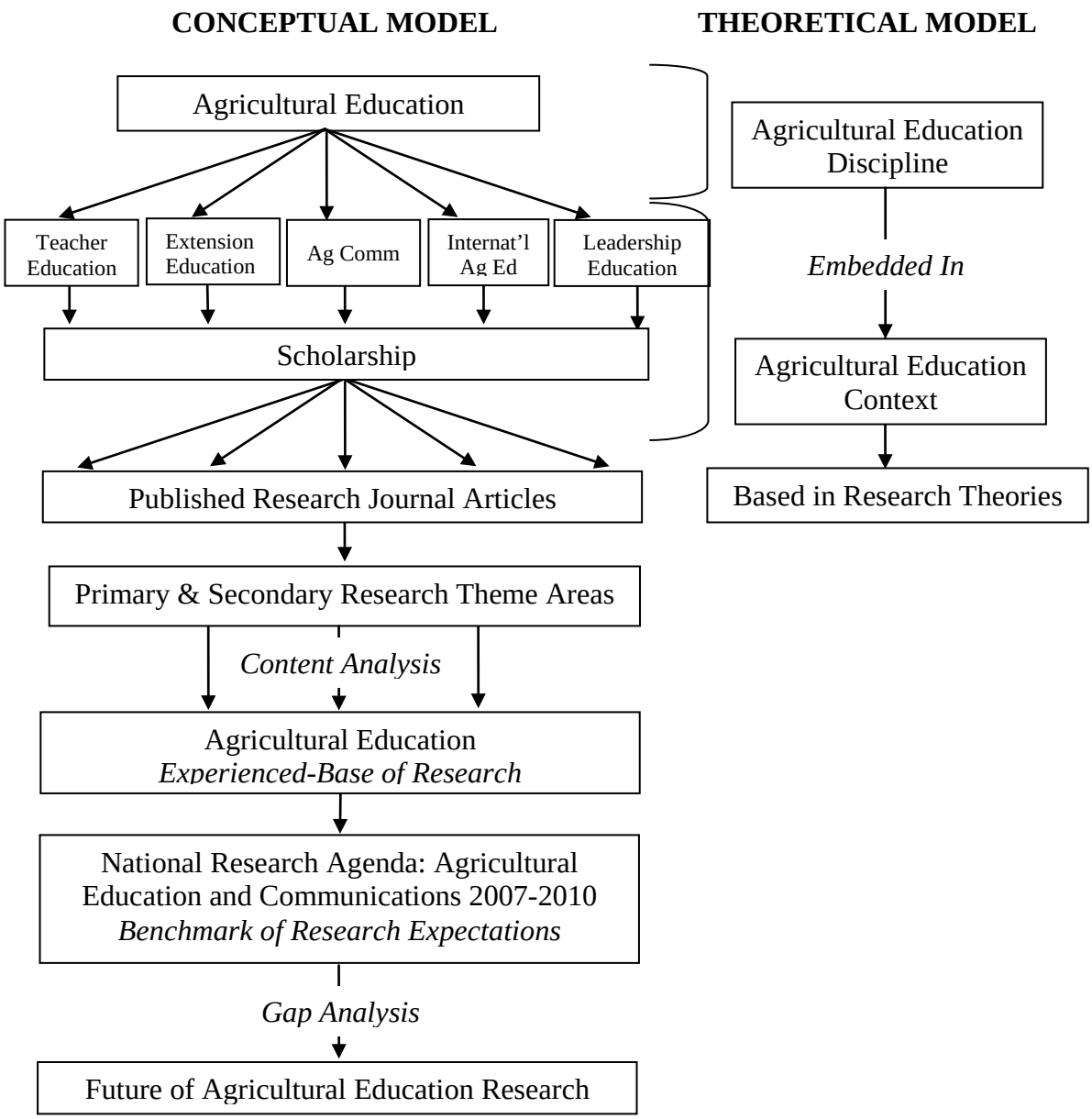

Figure 1. Theoretical and conceptual base of the study.

Purpose and Objectives

The purposes of this study, which was part of a larger study, were to review research published in major research journal outlets in agricultural education from 1997 to 2006 and to examine the status of the journals to provide a base from which to direct future research. Three objectives guided this study:

1. Determine premier research journals in agricultural education.
2. Describe and synthesize primary and secondary research theme areas from the journals identified in objective 1 for the timeframe of 1997 to 2006.

3. Determine frequencies and gaps in agricultural education (aged) research by comparing past research theme areas, identified in the premier aged journals, to the *National Research Agenda: Agricultural Education and Communication 2007-2010* (2007).

Research Methods and Procedures

This study employed a mixed-method content analysis design. Content analysis as a research method has existed for decades, and the best content-analytic studies use both qualitative and quantitative operations (Weber, 1990). Content analysis can be used to give researchers insight into problems or hypotheses that can then be tested by more direct methods. Content analysis is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Berelson, 1952; Krippendorf, 1980; Weber, 1990).

Face and content validity were maintained using previous research as a guide and a field study to focus the research. One hundred four individuals were identified as active agricultural education research authors based on a Delphi study by Baker, Shinn, and Briers (2007). Eight individuals were eliminated after failed attempts to identify usable email addresses. A field questionnaire was developed and sent to the identified authors. These individuals were to identify premier journals and to add validity to research theme categories. Research theme categories were created based on previous content analyses of journals in agricultural education. These categories were provided to the pilot study, and it was their responsibility to compress or expound on research theme areas. The pilot study identified thirty-seven research theme areas.

Dillman's Tailored Design Method was implemented (Dillman, 2000), and 62 of 94 possible respondents completed the questionnaire; a 66% response rate. Sixteen of the 62 field questionnaires were returned blank or partially completed and represented non-useable responses. Non-response error was controlled by comparing early to late respondents (Lindner, Murphy, & Briers, 2001). T-tests indicated no significant differences between the early and late respondents.

Research journal articles from 1997 to 2006 in the identified premier agricultural education journals were used as the frame for the study. The researcher and an assistant independently reviewed the material and formed a checklist of information required during the review of each journal article. The researchers compared notes and reconciled differences emerging on their initial checklists via negotiations. Researchers used a consolidated checklist to independently apply coding. The researchers then checked for agreement in coding; if reliability was not acceptable, then the previous steps were repeated. Once reliability had been established, the coding was applied on a large-scale basis. The final stage was a periodic quality control check (Weber, 1990). Inter-coder reliability of coding was completed independently, with at least 10% overlap for the reliability test. Final reliability was calculated using a random sample of 5% of the analyzed articles. Reliability was assessed using Spearman's rho for each variable. Reliabilities met or exceeded the minimum standard of .70.

Content analysis identified ninety-one research theme categories. A panel of research experts was used to independently review and then compile, compress, and collapse research theme areas. After the independent review, researchers checked for agreement on research theme

areas and adjusted research themes based on negotiations. This study is part of a larger study that recognized fifty research theme areas during the ten-year assessment.

Findings

Field study respondents indicated that the *Journal of Agricultural Education* (93%) was the premier journal in the agricultural education discipline. The *Journal of International Agricultural & Extension Education* was identified as the second premier journal (67%) in the discipline. The *Journal of Extension* was identified as the third premier journal (63%). The fourth premier journal identified was the *North American Colleges and Teachers of Agriculture Journal* (48%). *Journal of Applied Communications* (*43%*) and the *Journal of Leadership Education* (*41%*) were identified as the fifth and sixth most popular premier journals in agricultural education. Respondents nominated twenty-one journals as premier research outlets in agricultural education. Those journals identified by 40% or more of the respondents were used in this study. The researcher looked for a natural split in the frequencies of premier research journals. The natural split existed at a frequency level of about 40%. The *National Association of Colleges and Teachers in Agriculture* Journal (48%) was excluded from the study due to its broad college and teaching scope. Furthermore, the journal does not have a distinct focus on the subfield areas of agricultural education outlined in this study.

There were 1,151 articles analyzed. All research articles from 1997 to 2006 (323 articles) were examined in the *Journal of Agricultural Education (JAE)*. Articles in the *Journal of International Agricultural and Extension Education (JIAEE)* issues I and III, from 1997 to 2006, were analyzed (144 articles). All research (in brief) articles and feature articles with research methodologies in the *Journal of Extension*, from 1997 to 2006, were analyzed (548 articles). Articles in the *Journal of Applied Communications* identified as research or professional with research methodologies, from 1997 to 2006, were analyzed (91 articles). The *Journal of Leadership Education (JOLE)* was first published in the summer of 2002; research articles with research methodologies, since its inception until 2006, were analyzed (45 articles). The above journals were identified as the premier agricultural education (AGED) journals in the discipline by participants in the field study.

Primary research theme areas identified in premier AGED journals are shown in Table 1. There were 49 of the 50 identified research theme areas represented in the primary research theme area for premier AGED journals. Graphic design was not identified as a primary research theme area; however, it was noted as a secondary research theme. Food, agriculture, natural resources, health, and family was the most frequently identified primary research theme (14.16%). The second most frequent primary research theme was needs assessment, identified in 6.26% of the premier AGED research journal articles. Instructional and program delivery approaches was identified as the third most frequently used primary research theme (5.39%). Primary research theme areas identified in premier AGED research articles with 5.21% or fewer counts are identified in the following table.

Table 1
Primary Research Themes Identified in Premier Agricultural Education Journals 1997–2006 (N = 1,151, 49 primary research themes)

Primary Research Themes	*JAE* *f*	*JIAEE* *f*	*JOE* *f*	*JAC* *f*	*JOLE* *f*	Total *f*	Total *P*
Food, Agriculture, Natural Resources, Health, & Family	20	12	128	3	0	163	14.16
Needs Assessment	29	13	29	0	1	72	6.26
Instructional & Program Delivery Approaches	12	3	45	1	1	62	5.39
Youth Leadership & Development	12	0	45	0	3	60	5.21
Evaluation	12	23	22	0	1	58	5.04
Information Sources & Technology	2	2	28	17	0	49	4.26
Volunteer Development & Leadership	6	1	29	1	2	39	3.39
Teacher Preparation & Competence	33	2	1	0	1	37	3.21
Research (methods and models)	17	3	13	0	1	34	2.95
Curriculum & Program Development	7	9	13	3	0	32	2.78
Leadership Development	6	2	9	0	14	31	2.69
Perceptions & Attitudes Assessment	21	7	2	0	0	30	2.60
Distance Education	12	0	12	5	0	29	2.52
Diversity (culture, ethnicity, gender)	6	8	11	0	0	25	2.17
Professional Development	7	5	9	2	1	24	2.09
Communication Management	4	1	4	13	1	23	2.00
Globalization & Internationalization	2	14	5	0	0	21	1.82
Institutional Organization & Institutionalization-	8	5	5	3	0	21	1.82
Collaborations, Partnerships, & Coalitions	0	5	14	0	0	19	1.65
Academic Programs	12	5	0	0	1	18	1.56
Leadership Education	5	0	2	0	11	18	1.56
Leadership Management	10	0	7	0	1	18	1.56
Processes, Principles, & Styles of Learning	12	0	5	1	0	18	1.56
Critical Thinking	12	2	1	2	0	17	1.48
Career Development & Assessment	5	4	6	0	1	16	1.39
Organizational Development & Leadership	2	3	11	0	0	16	1.39

Table 1 (continued)

Primary Research Themes	*JAE* *f*	*JIAEE* *f*	*JOE* *f*	*JAC* *f*	*JOLE* *f*	Total *f*	Total *P*
Policy Issues	3	1	11	1	0	16	1.39
Communications of Scholarship	2	0	3	9	0	14	1.22
Service & Experiential Learning	7	0	4	0	3	14	1.22
Formal & Informal Teaching Approaches	4	0	8	0	1	13	1.13
Skill Development & Competencies	4	1	8	0	0	13	1.13
Accountability	0	0	9	3	0	12	1.04
Appropriateness of Education	10	0	2	0	0	12	1.04
Communication Technology	3	2	3	4	0	12	1.04
Knowledge & Competencies	6	5	0	0	0	11	0.96
Diffusion of Innovations	1	5	3	0	1	10	0.87
Biotechnology Communications	0	1	2	6	0	9	0.78
Marketing & Promotion	1	0	8	0	0	9	0.78
Media Relations	1	0	1	6	0	8	0.70
Quality of Life & Life Skills	1	0	7	0	0	8	0.70
Community Development & Leadership	0	0	7	0	0	7	0.61
Consumer/Audience Response & Analysis	0	0	4	3	0	7	0.61
Agricultural Literacy	4	0	0	1	0	5	0.43
Electronic Media	0	0	2	3	0	5	0.43
Funding (resource development and needs)	0	0	5	0	0	5	0.43
Risk & Crisis Communications	0	0	2	2	0	4	0.35
Business/Employee Mgmt & Expansion	0	0	3	0	0	3	0.26
Framing	0	0	0	2	0	2	0.17
Writing	2	0	0	0	0	2	0.17

Secondary research themes identified in premier AGED journals are displayed in Table 2. There were 49 secondary research theme areas identified. Biotechnology communications was the only research theme area not identified as a secondary research theme in premier AGED journals. The most frequently identified secondary research theme was food, agriculture, natural resources, health, and family (11.12%). The second most frequent secondary research theme was evaluation, identified in 8.69% of the research articles. Instructional and program delivery approaches was the third most frequently identified secondary research theme (6.78%). Secondary research theme areas identified 6.26% or less are identified in the table below.

Table 2
Secondary Research Themes Identified in Premier Agricultural Education Journals 1997–2006 (N = 1,151, 49 secondary research themes)

Secondary Research Themes	*JAE* *f*	*JIAEE* *f*	*JOE* *f*	*JAC* *f*	*JOLE* *f*	Total *f*	Total *P*
Food, Agriculture, Natural Resources, Health, & Family	21	16	78	13	0	128	11.12
Evaluation	18	12	67	0	3	100	8.69
Instructional & Program Delivery Approaches	16	5	53	3	1	78	6.78
Curriculum & Program Development	20	8	42	1	1	72	6.26
Youth Leadership & Development	17	2	42	0	2	63	5.47
Needs Assessment	8	6	37	4	1	56	4.87
Teacher Preparation & Competence	38	2	3	0	0	43	3.73
Institutional Organization & Institutionalization-	17	3	19	4	0	43	3.74
Distance Education	18	1	8	3	0	30	2.61
Diversity (culture, ethnicity, gender)	9	0	14	4	2	29	2.52
Information Sources & Technology	2	5	11	10	1	29	2.52
Formal & Informal Teaching Approaches	17	4	5	0	2	28	2.43
Academic Programs	12	6	0	2	4	24	2.09
Appropriateness of Education	15	4	4	1	0	24	2.09
Perceptions & Attitudes Assessment	9	11	1	3	0	24	2.09
Professional Development	9	8	5	0	0	22	1.91
Skill Development & Competencies	4	2	10	4	2	22	1.91
Globalization & Internationalization	1	15	1	3	1	21	1.82
Leadership Management	7	2	11	0	1	21	1.82
Research (methods and models)	6	4	8	1	0	19	1.65
Community Development & Leadership	3	5	8	1	1	18	1.56
Accountability	2	0	10	3	2	17	1.48
Leadership Development	4	0	8	1	4	17	1.48
Collaborations, Partnerships, & Coalitions	1	1	14	0	0	16	1.39
Processes, Principles, & Styles of Learning	12	0	3	0	1	16	1.39
Career Development & Assessment	4	4	5	1	1	15	1.30
Quality of Life & Life Skills	4	0	10	0	1	15	1.30
Leadership Education	5	1	0	0	8	14	1.22
Consumer/Audience Response & Analysis	1	0	9	3	0	13	1.13
Policy Issues	1	1	9	2	0	13	1.13

Table 2 (continued)

Secondary Research Themes	*JAE* *f*	*JIAEE* *f*	*JOE* *f*	*JAC* *f*	*JOLE* *f*	Total *f*	Total *P*
Volunteer Development & Leadership	5	0	7	0	1	13	1.13
Communications of Scholarship	5	2	2	3	0	12	1.04
Communication Management	0	0	5	6	0	11	0.96
Funding (resource development and needs)	0	1	7	2	0	10	0.87
Critical Thinking	4	3	1	0	1	9	0.78
Organizational Development & Leadership	0	0	6	0	3	9	0.78
Diffusion of Innovations	0	3	5	0	0	8	0.70
Knowledge & Competencies	4	4	0	0	0	8	0.70
Risk & Crisis Communications	0	2	4	1	0	7	0.61
Marketing & Promotion	1	0	5	0	0	6	0.52
Media Relations	2	0	0	4	0	6	0.52
Service & Experiential Learning	1	0	4	0	0	5	0.43
Writing	0	0	1	3	0	4	0.35
Business/Employee Management & Expansion	0	0	3	0	0	3	0.26
Communication Technology	0	1	0	2	0	3	0.26
Agricultural Literacy	0	0	1	1	0	2	0.17
Framing	0	0	0	1	1	2	0.17
Electronic Media	0	0	2	0	0	2	0.17
Graphic Design	0	0	0	1	0	1	0.09

Research themes identified in the premier AGED journals were used to analyze the *National Research Agenda (NRA): Agricultural Education and Communication 2007-2010* (2007). Data (research theme areas) from the content analysis were transformed /renamed /reclassified based on *NRA* content categorizes. Transformed data were used to identify frequencies and gaps in the agricultural education discipline. There are five contextual research category identified in the *NRA*, and 22 research priority areas. The *NRA* outlines research priority areas in the following areas: agricultural communications; agricultural leadership; agricultural education in domestic and international settings: extension and outreach; agricultural education in university and postsecondary settings; and agricultural education in schools.

Table 3 outlines research priority areas (RPA) and descriptions associated with each RPA as listed in the *NRA* and frequencies and percentages associated with the comparative gap analysis. RPA 1 through 4 relate to the context area of agricultural communications. RPA 5 through 8 relate to agricultural leadership. RPA 9 through 13 relate to agricultural education in domestic and international settings: extension and outreach. RPA 14 through 17 relate to agricultural education in university and postsecondary settings. RPA 18 through 22 relate to agricultural education in schools. The following table identifies the primary and secondary research theme frequencies, derived from research theme areas identified in content analysis of

premier AGED journals, as the research themes relate to the *NRA*. RPA 9 (ascertain the public's knowledge, views and openness regarding the agri-food and natural resource system) was the most frequently identified research priority area (26.2%). The research context area with the highest frequencies of research currently occurring was agricultural education in domestic and international settings: extension and outreach.

There were no gaps identified in the *NRA*. Gaps are areas of research outlined in the *NRA* (also referring in the research benchmark) that have not been seen in past research, as identified in the content analysis of premier AGED journals (experience-base of research). However, there were research themes that were not categorized into the *NRA*; yet, they were identified in analyzed premier AGED research articles from 1997 to 2006. These research theme areas are: funding (resource development and/or needs), graphic design, policy issues, research (methods and models), and writing. All research priority areas, outlined in the *NRA*, have previously been researched to some degree as identified in the assessed premier AGED journals, from 1997 and 2006.

Table 3
Summary of Primary and Secondary Research Themes Related to the Priority Areas of the National Research Agenda (N = 2,302)

RPA	Research Priority	*f*	*P*
1	Enhance decision making within the agricultural sectors of society.	182	7.9
2	Within and among societies, aid the public in effectively participating in decision making related to agriculture.	510	22.2
3	Build competitive societal knowledge and intellectual capabilities.	480	20.9
4	Develop effective agricultural work forces for knowledge-based societies.	346	15.0
5	Develop and disseminate effective leadership education programs.	367	15.9
6	Support leadership opportunities for underrepresented populations.	257	11.2
7	Ensure leader succession in sustaining agricultural enterprises, and enhance citizen engagement in rural and urban community development.	193	8.3
8	Engage citizens in community action through leadership education and development.	399	17.3
9	Ascertain the public's knowledge, views and openness regarding the agri-food and natural resource system.	604	26.2
10	Identify the needs and competencies of stakeholders and professional practitioners in nonformal agricultural extension education.	285	12.4
11	Identify appropriate learning systems to be used in nonformal education settings.	249	10.8
12	Examine appropriate nonformal educational delivery systems.	547	23.8
13	Identify and use evaluation systems to access program impact.	498	21.6
14	Recruit and prepare students for the future workforce in the agricultural and life sciences.	199	8.6

Table 3 (continued)

RPA	Research Priority	*f*	*P*
15	Improve the success of students enrolled in agricultural and life sciences academic and technical programs.	405	17.6
16	Enhance the effectiveness of agricultural and life science faculty.	341	14.8
17	Assess the effectiveness of educational programs in agricultural and life sciences.	305	13.2
18	Enhance program delivery models in agricultural education.	358	15.6
19	Provide a rigorous, relevant, standard-based curriculum in agricultural, food, and natural resources systems.	414	18.0
20	Increase access to agricultural education instruction and programming.	494	21.5
21	Prepare and provide an abundance of fully qualified and highly motivated agricultural educators at all levels.	289	12.6
22	Determine the effects of agricultural education instruction.	208	9.0

Conclusions, Discussion, and Implications

This study discovered variety in research theme areas in all identified premier agricultural education journals, and it is concluded that research in all journals are adding to the scope and topography of the agricultural education discipline. It was also discovered that there is extensive variety in research theme areas, in journals with fewer research articles (*JAC* and *JOLE*). When compiling research theme areas from multiple agricultural education journals, fragmentation and variety are multiplied. This is an indication that research journals in agricultural education are specialized, and they carry with them unique needs, authorships, focus, and impact. This study found that new research outlets (*JAC* and *JOLE*) have provided venues for additional research publications while also adding to the research fragmentation and variety in the discipline. The research theme areas, in all identified premier AGED journals, appear cyclic with research themes moving between primary and secondary and research areas moving out of primary and secondary for a time before cycling back in. The results from research theme areas can be seen as indicative of what the discipline values in terms of research.

Although a framework for future research has been created (*NRA*), the framework is not futuristic. Past research theme areas identified in the discipline are excluded in the framework, and no new research priority areas are identified. Furthermore, it is not clear which *NRA* research priorities are the most important and demand the most focus, or if past research is adequately fulfilling each research priority area. This research joins with concerns expressed by Williams (1991) in that it has been difficult to appraise the impact of agricultural education, and it is equally difficult to see its potential. Although the *NRA* aids researchers in exploring priority areas in the discipline, it adds little to solving the apparent research scatter and future research needs of agricultural education. This research adds to work by Buriak and Shinn (1993) and data from this study can be used to provide a current frame for the discipline to assist researchers in a clearer picture of past research. By understanding past research and priorities outlined in the *NRA* researchers can better employ research strategies that will assist agricultural education in becoming more progressive.

Recommendations

Additional research must be completed to expand the research themes identified in this study. Research, in this study, regarding the *National Research Agenda: Agricultural Education and Communication 2007-2010* (2007) was completed on the macro level. More in-depth research must be conducted to determine which of research priority areas are the most critical and demand the immediate attention. Research priority areas in the *NRA* are broad and vague. Efforts must be made to clarify each research priority area and suggestions for future research must be made. It is not clear whether research currently occurring in agricultural education is adequately meeting the needs of each research priority areas identified in the *NRA*. Additional research must be conducted to determine whether current research is meeting the needs of each area or if additional futuristic research is needed. Additions, revisions, and deletions to the *NRA* must continue. Furthermore, research agendas must be developed on the regional and state levels.

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FACTORS INFLUENCING FACULTY MIGRATION TO DEPARTMENT CHAIR POSITIONS IN COLLEGES OF AGRICULTURAL AND LIFE SCIENCES

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The purpose of this study was to identify and describe factors influencing the decisions of faculty members to migrate to department chair positions in colleges of agricultural and life sciences. A researcher-developed questionnaire was delivered to department chairs in 1862 land-grant colleges of agricultural and life sciences who had been appointed to their administrative positions on or before July 1, 2004. Respondents in 35 of the 50 states in the continental U.S. completed the web-based instrument, which assessed decision information, self-efficacy, and demographic characteristics. The dependent variables in the study were academic unit leader self-efficacy and department chair decision information. The independent variables were gender, ethnicity, age, and experience in education. The participants were described in terms of their demographics, self-efficacy scores and decision information based on their choice to become a department chair. Participants in this study reported that they enjoy working with people. They also identified a strong need for leadership within their profession. The opportunity to build a great department, the persuasion of other colleagues, having many ideas for change, looking for an opportunity to make a higher level impact, and being ready for a new challenge had at least a moderate influence in their decision to pursue a department chair position. Participants felt moderately confident they could execute the roles and responsibilities of a department chair in the areas of leadership, management, and personnel affairs. This study also found that 84.4% (n=81) of the participants were male and 15.6% (n=15) were female. Also, 97.9% (n=94) were Caucasian. No relationships were found between gender, ethnicity, and age with regards to the decision information or self-efficacy.

Introduction and Background

Colleges and universities around the nation are undergoing rapid and demanding change (Kellogg Commission, 1996). According to the Kellogg Commission on the future of state and land-grant universities, change will present growing challenges for post-secondary institutions in the years ahead (1996). These areas of change are due in part to the external environmental changes that state and land-grant universities are facing, including changes in society, the economy, technology, public perceptions, enrollments, demographics, and faculty (Byrne, 2006). This study implemented survey research to specifically examine the factors influencing faculty migration to department chair positions in colleges of agricultural and life sciences by studying newly appointed academic unit leaders across the United States. The academic department chair is often viewed as the central building block of the American University (Trow, 1977, p.3).

With the growing demand for post-secondary education and increasing student enrollments, understanding the condition of higher educational administration is critical (Evenlyn, 2004). Campus leaders around the nation cite the rising demand for quality leadership as the number one issue facing post-secondary institutions (Byrne, 2006). Another change is a "seismic shift" in public attitudes, and administrative leaders must be willing and able to guide the university and its departments through new demographics, exploding technologies, student accountability, and external demands (Taking Charge of Change: Reviewing the Promise of State and Land-grant Universities, 1996). This changing university environment illustrates that

post-secondary institutions must become places that not only inspire and cultivate superior students who are ready to take on this new era, but also have the same impact on faculty and staff (Byrne, 2006). These changing universities will require leaders who possess excellent communication skills, expertise in management, the ability to organize groups of people, and the ability to collaborate with scholars from a variety of cultures, values, and traditions (Muhammad, 2002). According to Steven J. McGriff, managing this transformation has altered the way universities and colleges are administered and will be the key to their survival (2001). The alteration of "business as usual" has changed so much that many higher educational institutions have very few current practices that parallel their original roots.

Few issues are of greater concern for institutions than the development of sustainable leadership for the future. In fact, Conger and Fulmer (2003) suggested that over the past several years, a growing need exists for qualified individuals to pursue leadership roles in all aspects of business, education, and volunteerism. Within universities, research focused on motivation, self-efficacy, and career choices in pursuit of department chair positions has been limited. Recent changes in technology, communication, educational advancement, faculty development, workload demand, and expectations documented in post-secondary education have created a potential crisis in educational leadership in the United States (Boehlert, 1999). A greater understanding of faculty career choices, especially in the area of academic unit leadership in post-secondary institutions, is needed (Report of the Task Force on Faculty/Staff Partnership, 1999). A faculty-staff development task force assembled by the University of California concluded that, "Faculty often become administrators based on their academic achievements, and more information is needed, especially at the department chair level" (Report of the Task Force on Faculty/Staff Partnership, 1999). Identifying the variables that exert the greatest influence as faculty members decide to pursue department chair positions becomes a key aspect of reshaping the future of higher education (Tucker, 1993).

Each department within a university has an administrative leader known as the academic department chair or department head. With the documented changes in demand faced by higher education, there is no question that an extensive "re-definition" has taken place in the roles and responsibilities facing a department chair (Hecht, Higgerson, Gmelch, Tucker, 1999). Department chairs will undoubtedly be responsible for managing and leading change in colleges and universities across the nation (Tucker, 2006). A better knowledge of the factors contributing to faculty decisions to assume department chair positions is needed (Report of the Task Force on Faculty/Staff Partnership, 1999). This knowledge would enhance recruitment efforts, potentially resulting in more successful searches. Known influential factors could also be incorporated into faculty and administrative development programs.

Theoretical Framework

According to much of the literature, the responsibilities of a department chair position can be grouped into a number of categories. An extensive list of different roles and responsibilities can be found for a department chair, and a significant amount of research has been conducted in defining exactly what a department chair does on a regular basis (CSDC, 1992). When scanning the literature for specific duties, a repetitive pattern occurred for the job description of a department chair. Several sources have been identified that most clearly represent the detailed lists of department chair roles and responsibilities.

The theory of self-efficacy is a fairly new development in the social sciences that began with Bandura's (1977) publication, "Self-Efficacy: Toward a Unifying Theory of Behavioral Change." There is a natural tendency for humans to desire the ability to exercise control not only over their lives, but also the variety of circumstances that arise on a regular basis (Bandura, 1995). In the most elementary form, efficacy is the ability to produce necessary or desired results, or in other words, an individual's effectiveness. For a more scholarly approach, the literature quickly turns to Bandura where "self-efficacy" is defined as, "the belief in one's ability to organize and execute the courses of action required to manage prospective situations" (1994, p.72). Or perhaps more importantly, self-efficacy is an individual's belief about his/her capabilities to produce designated levels of performance that exercise influence over events that affect their lives (Bandura, 1994). The focus is clearly on one's belief. This is important to note because Bandura suggested that an individual's self-efficacy is fundamental to a person's success. Someone who has high self-efficacy is more likely to take on new experiences, challenges, and obstacles with high self-confidence and a preset mindset of success. On the other hand, a person with low self-efficacy looking at the same set of circumstances will tend to avoid challenging tasks and behaviors and approach them, if at all, with low confidence (Bandura, 1994).

When making decisions and choices about future actions, a person's self-refection of past experiences becomes extremely important. One's belief in one's ability to perform a task has been found to have a direct relationship to self-reflection (Bandura, 1986). Naturally, people engage in behaviors and tasks in which they feel confident and competent (Pajares, 1996). Furthermore, the amount of effort and energy a person spends on a given activity is also related to one's self-efficacy or self-belief. This point extends to challenges and obstacles as well, whereas a person's resilience will be greater when a perceived ability for a given situation is greater (Pajares, 1996). Parajes presented the use of self-efficacy in a variety of contexts and areas of study. This theory was used to study phobias (Bandura, 1983), depression (Davis & Yates, 1982), social skills (Moe & Zeiss, 1982), assertiveness (Lee, 1983), and athletic performance (Barling & Abel, 1983). In the area of higher education and academic motivation, self-efficacy has become a variable of greater research interest (Pintrich & Schunk, 1995).

Self-efficacy as it relates to career decisions is represented in much of the literature through the Social Cognitive Career Theory (SCCT), which emerged from the work of Lent et al. (1994) and is being used to further explain the decisions individuals make in reference to their career choices. The SCCT is applicable to the factors influencing the migration of faculty members to department chair positions in colleges of agricultural and life sciences using an emphasis on the three areas of focus that surround a career decision: environmental factors, personal factors, and an individual's behavior (Lent, et al., 1994). Behaviors can be explained by environmental influences or impacts in people's lives, internal motivation, or personal factors. The Social Cognitive Career Theory explains that the reality of human behavior is far from unidirectional and is much more interlinked and "triadic," as illustrated in Figure 1.1. Personal factors, environmental events, and behavioral patterns influence human action in a unique and bidirectional way (Bandura, 1999).

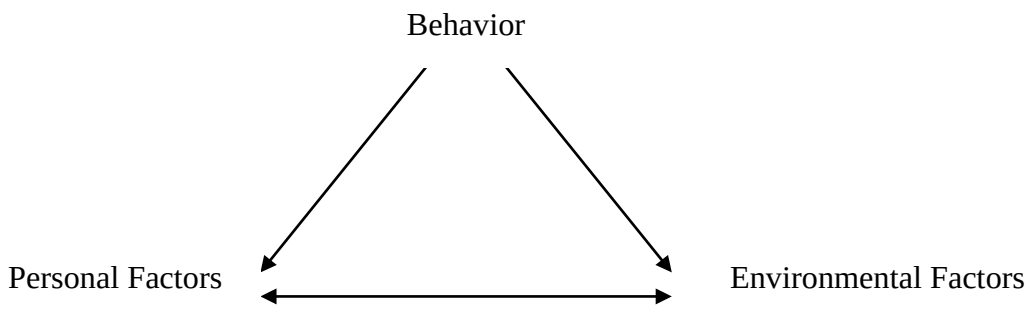

Figure 1-1. Model of Triadic Reciprocality (Bandura, 1997)

The Expectancy Value Theory of Achievement Motivation by Wigfield and Eccles has been used to explain the motivation underlying a person's behavior (Wigfield & Eccles, 2000). The theory was first developed as a model to gain insight and understanding on early childhood achievement in mathematics (Eccles, et al., 1983). Achievement motivation theories attempt to explain personal choice of tasks, persistence, and vigor in performance and quality of task engagement (Eccles, Wigfield, and Schielefe, 1998). According to Expectancy Value theory, behavior is a function of the expectations an individual has and the value of the goal toward which that individual is working. Wigfield and Eccles pointed out the importance of intent on a decision to pursue a behavior. They also contended that intent is the immediate precursor to a particular behavior (2000). The Expectancy Value theory states that there are two kinds of belief: belief in something and belief about something. According to this theory, beliefs vary from attitudes, because they are evaluative. People usually believe that their behavior will lead to both positive and negative consequences. Their attitude is based on whether or not the end result is favorable. According to the Expectancy Value theory, information can have three effects on attitude change. Firstly, information can change the weight of a particular belief. Secondly, information can affect the direction of a particular belief. Thirdly, information can add new beliefs (Wigfield, Eccles, 2000).

Purpose and Objectives of the Study

The purpose of this study was to describe the factors influencing the decisions of faculty members to migrate to department chair positions in colleges of agricultural and life sciences. The following research objectives were used to guide this investigation:

1. To determine the specific factors that led recently appointed department chairs in colleges of agricultural and life sciences to pursue and accept department chair positions.

2. To assess newly appointed department chairs' self-reported degree of self-efficacy in executing their roles as a department chair.

3. To examine the relationship between selected demographic characteristics and (a) self-reported levels of self-efficacy and (b) the degree of influence of factors in seeking department chair positions.

Procedures

This study employed census survey research using an instrument developed by the researcher. According to Ary et al. (2002), a census study can be used to examine motivation, achievement, and other such psychological related constructs. The population of this study consisted of newly appointed department chairs at universities established by the Morrill Act of 1862. Each of these universities had a college of agricultural and life sciences with distinctive departments or comparable units in which a leadership position was established and well known as a department chair. The "newly appointed" department chair was defined for the purposes of this study as current academic department chairs (or heads) in colleges of agricultural and life sciences that were appointed to their positions on or after July 1, 2004.

Prior to the collection of the primary data for this study, a pilot test of the instrument was conducted. The survey format consisted of four sections of Likert-type items, demographic questions, and a series of open-response items. The survey was administered to a convenience sample of 10 current department chairs in land-grant colleges of agricultural and life sciences. Within the pilot study group, 90% (*n*=9) were male and 10% (*n*=1) were female. In terms of ethnicity, 100% (*n*=10) were Caucasian. The age of the participants ranged from 51 to 63. The pilot test group closely resembled the actual population of recently appointed department chairs in land-grant colleges of agricultural and life sciences in age, gender, position, and university structure. Based upon reliability analysis of the pilot test data, several modifications were made in the instrument before administering it to the study population. Reliability estimates were acceptable for all constructs. (See Table 1-1 and 1-2.)

Table 1-1. Pilot Study Reliability

Characteristic	# of Questions	Reliability
Department Chair Decision information	18	.744
Leadership Self-Efficacy	18	.843
Management Self-Efficacy	9	.831
Personnel Affairs Self-Efficacy	10	.874

Note. All reliability coefficients were estimated using Cronbach's alpha. (n=10)

Table 1-2. Reliability for Actual Study Constructs

Construct	# of Questions	Reliability
Department Chair Decision information	18	.842
Leadership Self-Efficacy	18	.915
Management Self-Efficacy	9	.888
Personnel Affairs Self-Efficacy	10	.917

Note. All reliability coefficients were estimated using Cronbach's alpha. (n=131)

Data were analyzed using the SPSS for Windows statistical package. Likert-type items were treated as interval data (Clason & Dormody, 1994). Frequencies, percentages, measures of central tendency, and correlations were used to describe the data. Although this was a census study, inferential analysis (t-tests and ANOVA) was used on an exploratory basis to gain a better understanding of the data.

Findings

Objective one sought to determine the specific factors that led recently appointed department chairs in colleges of agricultural and life sciences to pursue and accept department chair positions. This section of the instrument consisted of 18 items measured on a seven-point Likert-type scale. This scale was used based on the guidelines of Albert Bandura (2001). A scale constructed in this manner can be assumed to have equal degrees of assurance between values and therefore can be treated as interval data (Bandura, 2001). The definitions for the means were as follows: 1.00 to 1.49, no influence; 1.5 to 2.49, little influence; 2.5 to 3.49 some influence; 3.5 to 4.49, moderate influence; 4.5 to 5.59, considerable influence; 5.5 to 6.49, substantial influence, and 6.5 to 7.0, absolute influence. The four factors with the highest means were reported as having a moderate influence. These statements included the following: "I enjoy working with people and seeing them succeed" (μ =5.32), "There was a strong need within my profession for effective department leadership" (μ =5.09), "I wanted the opportunity to build a great department" (μ =4.85), and "I was persuaded by others such as colleagues, deans, and/or current department chairs" (μ =4.85). The two factors with the lowest means, or those having almost no influence were, "I had a positive previous experience as an acting or interim department chair" (μ =1.96), and "I wanted the status or prestige of such a position" (μ =1.95).

Objective two sought to assess newly appointed department chairs' self-efficacy in relation to their expectations and choice to assume such a department chair position. Self-efficacy in executing the roles and responsibilities of a department chair was divided into three categories for the purposes of this study: leadership, management, and personnel affairs. Self-efficacy was also based on 7-point Likert-type scale, and the definitions for the means were as follows: 1.00 to 1.49, could not do; 1.5 to 2.49, could do with little certainty; 2.5 to 3.49, could do with some certainty; 3.5 to 4.49, could do with moderate certainty; 4.5 to 5.59, could do with considerable certainty; 5.5 to 6.49, could do with substantial certainty, and 6.5 to 7.0, could do with absolute certainty. For leadership self-efficacy, the two items that displayed the highest means (substantial certainty) were, "Solicit ideas to improve the department" (μ =5.64) and "Demonstrate strong support and understanding of the mission of a land-grant university" (μ =5.64). Including those two tasks, fifteen other responsibilities had means of 4.53 to 5.43, indicating a self-efficacy rating of considerable certainty or higher. Only one of the eighteen roles and responsibilities listed under the area of leadership exhibited a mean of moderate certainty - "Remaining current within their academic discipline" (μ =3.70).

For management self-efficacy, the item that exhibited the highest mean was, "Conduct department meetings" (μ =5.62). This indicated that newly appointed department chairs felt that they could complete this task with considerable certainty. Four other management roles and responsibilities had a calculated mean of greater than 5.00, or a self-efficacy rating of considerable certainty or greater. The remaining four roles exhibited means of moderate certainty and ranged from 4.62 to 4.99. The task that exhibited the lowest mean, but still in the considerable certainty category, was "Prepare the department for accreditation and evaluation" (μ=4.62). Again, according to the data obtained by the survey instrument, respondents reported that they could perform the collective set of management responsibilities with a considerable degree of certainty.

In the area of personnel affairs, six of the ten roles and responsibilities exhibited means of 5.00 or greater and fell under the considerable certainty category. The item displaying the highest mean was, "Encourage faculty participation in department decisions" (μ =5.59). Three of the roles and responsibilities we were ranked as "I could do with moderate certainty" and had means ranging from 3.58 to 4.27. The factor exhibiting the lowest mean was, "Initiate termination of a faculty member" (μ =3.48). As a whole, respondents indicated that they could complete the personnel affairs tasks with a moderate degree of certainty.

After a one-way analysis of variance was completed and a statistically significant difference was observed in all three self-efficacy areas with respect to current versus past views relating to the roles and responsibilities of a department chair, a post-hoc analysis was conducted to determine the specific groups in which a difference occurred. The means for the groups are reported in Table 1-3. Tukey's post-hoc analysis revealed that all three self-efficacy areas - leadership, management, and personnel affairs - were statistically significant different in one pair. The pair that was different for all groups was 1, very similar 2, somewhat similar. No other comparisons exhibited a significant difference. The data indicated that self-efficacy and current versus past views relating to the roles and responsibilities of a department chair were more influential for those chairs who indicated that their past and current views were somewhat or very similar. That is, respondents who reported that their current views about the department chair role were very similar to their views before becoming a chair had a higher self-reported self-efficacy score in all three dimensions of self-efficacy than those who reported that their prior and current views were only somewhat similar.

Table 1-3. Means of Self-efficacy Compared to the Similarity of Current vs. Past Views of a Department Chair

Self Efficacy in Leadership	n	*M*	*SD*
Very Similar	35	96.60	12.715
Somewhat Similar	55	86.93	15.060
Slightly Similar	5	92.20	4.970
Not Similar At All	2	85.00	12.728
Self Efficacy in Management			
Very Similar	35	50.31	7.251
Somewhat Similar	55	43.44	7.769
Slightly Similar	5	45.40	5.225
Not Similar At All	2	43.50	4.950
Self Efficacy in Personnel Affairs			
Very Similar	35	54.09	10.001
Somewhat Similar	55	45.31	8.346
Slightly Similar	5	46.00	8.031
Not Similar At All	2	40.00	15.556

Objective 3 examined the relationship between selected demographic characteristics and self-reported levels of self-efficacy, as well as the degree of influence of factors when seeking department chair positions. Of the 97 newly appointed department chairs who participated in this study, 84.4% (n=81) were male and 15.6% were female. In terms of ethnicity, 97.9% were

Caucasian, and 2.1% were Hispanic. The age of the participants ranged from 42 to 71 years, with a mean age of 53 years.

A large majority of newly appointed department chairs (87.6%) indicated that their current position was the first department chair position held on a permanent (versus acting or interim) basis. Twelve participants (12.4%) reported that they had previously held a permanent department chair position. Out of the 97 respondents, 30 (30.9 %) indicated that they were an acting or interim chair at one point prior to accepting their current chair position, whereas 67 participants (69.1%) had never held an interim or acting department chair position.

Of the newly appointed department chairs surveyed, 28.9% of the respondents indicated that they would serve another term as department chair with no reservations, 40.2% of the respondents indicated that they would serve another term with some reservation, 19.6% of the respondents said they would probably not serve another term, and 5.2% indicated that they would definitely not serve another term.

In reference to their current views on the roles and responsibilities of department chairs now as compared to their views prior to becoming a department chair, 37.1% indicated their current and previous views are very similar, 54.6% recorded their current views as somewhat similar, while 5.2% indicated their views were slightly similar, and only 1% reported that their current views of the roles and responsibilities of a department chair compared to their views prior to their appointment were not similar at all.

Substantial correlations were found to exist between age and year tenured (r = -.51), age and the year the rank of full professor was attained (r = -.61), age and the year the rank of associate professor was attained (r = -.54), age and the year the rank of assistant professor was attained (r = -.54). (Note: Since the actual year in which a professorial rank was obtained was used as the data point for this variable, a negative relationship was associated with an earlier promotion year. Older respondents tended to achieve each rank in earlier rather than more recent years, which led to negative correlation values.)

A moderate, positive relationship (r=.43) was found between leadership self-efficacy and the degree to which the listed factors influenced the respondents' decision to become a department chair (r = .43). Similar relationships were found between the influence of these decision factors and management self-efficacy (r=.31), personnel affairs self-efficacy (r=.33), and number of department chair positions for which they applied (r = .35). Thus, department chairs who reported a higher level of influence of the decision factors had a moderate tendency to apply for more department chair positions. Respondents who reported that their department chair position is similar to the expectations they held about such a position before becoming a department chair had a moderate tendency to report higher levels of leadership self-efficacy (r = .32) and personnel affairs self-efficacy (r = .35). Finally, department chairs who reported a higher level of influence of the decision factors had a moderate tendency (r=.36) to seek a second term as department chair.

Conclusions

The following conclusions were drawn based upon the findings of the study:

A joy of working with people and seeing them succeed, a strong perceived need for departmental leadership within a given discipline, the opportunity to build a great department, and persuasion by another individual such as a colleague, dean, and/or department chair have a considerable influence on a faculty member's decision to seek a department chair position.

The desire for status and prestige, as well as prior experience as an acting or interim department chair, has little influence on a faculty member's decision to seek a department chair position. Faculty members do not seek department chair positions due to because of the following unappealing dimensions of the job: management issues related to dealing with budgets, increased workload, increased time demands, and dealing with people. In addition, some faculty members enjoy their current positions and do not want to leave their teaching/research appointments. Increasing the amount of leadership training opportunities for faculty members throughout the department and university, increasing the amount of monetary compensation and resources given to department chairs, and providing more administrative staff support might increase faculty interest in becoming a department chair. Service in other academic and non-academic leadership capacities (i.e., committee chairs, administrative leadership positions, higher education programs, non-profit groups, and industry) helps to prepare faculty members to assume department chair positions.

Newly appointed department chairs are moderately confident in their ability to execute their leadership, management, and personnel affairs responsibilities. Furthermore, newly appointed department chairs tend to hold similar views of personal self-efficacy across all three areas of responsibility. Newly appointed department chairs are substantially confident in their ability to solicit ideas to improve their departments and demonstrate strong support for and understanding of the land-grant mission. Newly appointed department chairs are concerned about their ability to remain current within their academic discipline while serving as a department chair. Conducting meetings and responding to inquires and requests for information are management tasks of an academic chair that newly appointed department chairs can complete with substantial certainty.

Dealing with conflict and unsatisfactory performance among faculty and staff, as well as initiating the termination of a faculty member, are areas of lower self-efficacy as reported by newly appointed department chairs. These department chairs are also more likely to apply for multiple department chair positions. Further, department chairs with a clearer, more accurate view of the department chair position as a faculty member tend to be more confident in their ability to perform their duties once they assume a department chair position. Newly appointed department chairs whose views of the position prior to the appointment align with their current views are more confident in their ability to execute their responsibilities as department chair. Females and minorities are underrepresented among newly appointed department chairs in colleges of agricultural and life sciences. Newly appointed department chairs feel that department chairs, in general, are well respected by faculty members and administrators.

Recommendations

For department chairs to perform well in a very inconsistent and complex environment, they must have the support of the faculty within the department, as well as administration. Clear guidelines for proficiency should be communicated from the outset to new department chairs and discussed on a regular basis. Feedback from departmental constituents and university administration is vital. Furthermore, deans should share the list of roles and responsibilities from this study with newly appointed department chairs. The three areas of roles and responsibilities – leadership, management, and personnel affairs – should be used as guidelines for evaluation and job description development for department chairs in colleges of agricultural and life sciences.

College administrators and professional societies should use the list of roles and responsibilities to proactively identify, prepare, and motivate faculty members to seek department chair positions. The relative confidence of newly appointed department chairs in performing the multitude of responsibilities associated with the department chair position, as found in this study, should be used by college administrators to determine the different types of workshops necessary to support newly appointed department chairs. When identifying faculty for department chair positions, administration and search committees should seek those individuals who enjoy working with people and seeing them succeed, as well as those who have the ability to provide visionary thinking for the department. Findings from this study suggest that faculty members can be persuaded by colleagues and others to apply for department chair positions. Thus, current administrators should proactively recruit high potential candidates for department chair positions

Deans should focus on evaluating the management responsibilities of department chairs and find ways to assist them in completing these tasks. This assistance could include, but is not limited to, leadership and management training, adequate support staff, role definitions, and limiting the job responsibilities of academic chairs.

An innovative and participatory method of assisting department chairs of colleges and agricultural life sciences in remaining current within their academic disciplines should be implemented by the faculty of their department. This participatory method should include faculty reporting to the department chair as an updating method. This can be done on an annual or quarterly basis.

A leadership preparatory system or program in colleges of agricultural and life sciences in can help to develop and prepare faculty for the ever-changing demands of higher educational leadership. Furthermore, a quality leadership development program specifically targeting low self-efficacy points among leadership, management and personnel affairs tasks would encourage and promote more qualified faculty to pursue department chair positions. Professional societies should focus on faculty leadership development and provide experiences that will help prepare faculty for effective department leadership.

In this study, gender had no relationship to overall self-efficacy and decision factor influence or perceived ability to complete the roles and responsibilities of a department chair. This finding further supports giving equal consideration to male and female candidates when

filling department chair positions in colleges of agricultural and life sciences. Programs to support and promote underrepresented ethnic groups as they consider positions at the department chair level should be implemented.

Discussion and Implications

Since relating to people and building a positive environment are attractive aspects of department chair positions, as stated in the literature, it was not surprising to see a joy of working with people and seeing them succeed, a strong need for departmental leadership within a given profession, the opportunity to build a great department, and persuasion by another individual such as colleague, dean, and/or department chair rise to the top of the list among the most influential factors in deciding to become a department chair. The department chair is oftentimes reported as the "front-line" manager that serves a variety of people within the university (Tucker, 1993). There is almost an expectation for department chairs to create a strong, family-like environment to build each other up, be inclusive in the decision making process, and encourage excellence of one another (Tucker, 1993). This is not an easy task, but one that is placed in the hands of the academic department chair on a regular basis (CSDC, 1992). The influence of persuasion by others to encourage faculty to assume chair positions is also a key finding and one that corresponds with the department chair literature (Graham & Benoit, 2004). Many other factors had a moderate influence on faculty members' decisions to assume chair positions – not surprising, based upon the literature.

These factors exhibited in this conclusion also align with the Social Cognitive Career Theory (SCCT), which further explains the process by which individuals develop an interest, make choices and achieve varying levels of success in academic pursuits (Lent, et al., 1994). Furthermore, Bandura (1997) suggested that the pattern of decision making can be broken down into three parts, which include personal factors, behavior, and environmental factors – or what he calls "triadic reciprocality." These three factors do not influence decision making independently, but instead have a codependent and interchangeable influence. Each of the top four factors found to influence faculty members' decisions in their careers tie directly to Bandura's three areas. The first one, a joy of working with people and seeing them succeed, is directly tied to what Bandura would describe as a self-belief or habit of thinking (Bandura, 1999). The second and third factors, a strong need for departmental leadership within a given profession and the opportunity to build a great department are what the SCCT would explain as an environmental factor or the existing structure of administration and facilities. Finally, persuasion by another individual, such as a colleague, dean, and/or department chair is a behavior of leadership by others, as well as a self-regulatory practice that is fostered by an outside environment.

The academic department chair is one of the most influential positions within the higher educational system operating under a shared governance system (Rowley & Wheeler, 1993). The academic department chair is also one of the most complex job descriptions in academia (Seagren, Creswell, Wheeler, 1993). Data from this study confirm that faculty members would not be influenced by the status and prestige when considering a department chair position. Also, after serving as an interim chair, a faculty member is exposed to not only the complex list of roles and responsibilities that come with the job, but also the ambiguity and lack of structure that comes with an interim position (CSDC, 1992).

As the literature indicated, the growing management demands of an academic department chair are quite extensive and cause current chairs a significant amount of stress (Tucker, 1993; CSDC, 1993; Graham, Benoit, 2004; Hecht, et al., 1999). When asked why more faculty members do not seek department chair positions, management-related issues were identified by nearly one-third of the responses in this study. These responses would be very consistent with the rise in management-related demands associated with higher educational administration. Also, these types of tasks consume a majority of the time of an academic department chair and leave little room for flexibility (Hecht, et al., 1999). Responding to long lists of electronic mail, balancing ever-changing budgets, and dealing with a never ending stream of people related issues, while at the same time attempting to complete the other roles and responsibilities associated with an academic chair position, are viewed as very difficult or sometimes impossible tasks.

In the same respect, many faculty members truly enjoy their teaching and research appointments and find themselves not wanting to give up those duties for an administrative role. It was also mentioned by several respondents that a department chair positioncan destroy an academic career and is seen as a "thankless" job with little reward. These results provide a very candid, yet powerful, indicator that some changes in higher educational administration must be implemented. In many cases it is not the lack of a salary increase, but rather the separation from teaching and research and lack of administrative support that prevent faculty members from seeking department chair positions.

Increasing the amount of leadership training opportunities for faculty members throughout the department and university, increasing the amount of monetary compensation and resources given to department chairs, and providing more administrative staff support might increase faculty interest in becoming a department chair. This conclusion ties together a few key findings of this study. The first deals with providing leadership training opportunities for faculty members. The results of this study revealed that newly appointed department chairs found that leadership training at both the university and department level were very helpful and influential in their decisions to become department chairs. The second finding relates to compensation and resources. Newly appointed department chairs indicated that they did not feel the monetary compensation and resources provided to them were enough to cover the demands and scope of the position. Finally, increasing administrative staff support was mentioned as a fey factor to raising the interest of faculty to take on department chair positions. This finding also supports a prior conclusion that the management challenges faced by department chairs are a deterrent when faculty members considering such a position.

The findings of this study are encouraging in terms of the increasing percentage of females that hold department chair positions. However, several several concerns still remain. Findings of this study suggest that diverse populations in newly appointed department chair positions in colleges of agricultural and life sciences are not underrepresented as a function of self-efficacy and the decision factors. It is possible that women and minorities are underrepresented for other reasons besides self-efficacy and the prescribed influencing factors. Further research should be conducted as to why the number of females and minorities in department chair positions is extremely low, as well as the motives of females and minorities who do not seek department chair positions.

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RESEARCH THEMES, AUTHORS, AND METHODOLOGIES IN THE *JOURNAL OF AGRICULTURAL EDUCATION*: A TEN YEAR LOOK

A Critique by Randol G. Waters, Professor - University of Tennessee

Major Strength of the Paper:

This is a generally well written paper that addresses a recurring topic in our profession in a new and somewhat more interesting way. While we have read numerous research journal content analyses over the past decade, these authors attempt to draw from their research "implications for future direction" along with the traditional "findings from the past". This first of two similar manuscripts they present in this session reviews ten years of articles published in the *Journal of Agricultural Education*, the premier journal of our profession. The conceptual model developed for the research is clear and succinct. It attempts to describe the agricultural education discipline through five subfields of published research by research themes, most prolific authors and research methods. The authors describe their content analysis procedures meticulously and provide evidence of inter-rater reliability for their coding schemes. It stops short of discussing implications for future research, even though the introduction implies that it may, but a second paper in this session written by the same authors does delve into this subject.

Suggestion(s) For Improvement:

While most of the themes are clearly stated and easy to understand, several appear to be a bit unclear and it would be helpful if some examples of manuscripts falling under those categories were provided in the narrative description. For example, the theme of "Food, Agriculture, Natural Resources, Health, and Family" seems to be a hodge-podge of sub-themes that don't have a lot in common. Further, "Institutional Organizations and Institutionalism" is another vague theme that needs further explanation. It would also be helpful to clearly define the difference between a "primary theme" and a "secondary theme". While I assume that secondary themes were derived from articles having a clearly identified "primary theme", it isn't clear how the authors arrived at these two "theme classifications".

Implications:

The authors indicate that the decade of the 90's was a time of "rapid growth" in research and publishing for our profession. They conclude that there are nearly 40 research themes represented in the ten year publication of this journal. While it appears that this is a positive finding for our profession that is based somewhat on the recommendations of some of the profession's leaders quoted in the literature, it is interesting to note that our research methods and research design have not changed that much. Particularly noteworthy is the finding that nearly half of the research design utilized during this ten year period is "survey research". While the authors don't identify the type of survey research specifically, I suspect it is primarily "descriptive survey research". While much can be revealed using this design, its strong prevalence in our profession is something that causes our research to be criticized by other social science researchers in our field.

RESEARCH THEMES IN AGRICULTURAL EDUCATION: FUTURE GAP ANALYSIS OF THE NATIONAL RESEARCH AGENDA

A Critique by Randol G. Waters, Professor - University of Tennessee

Major Strength of the Paper:

This is the second of two papers presented by the same authors. Both papers are similar and have been written utilizing some of the same data gathering sources and procedures. It is based upon the same conceptual model and utilizes essentially the same methodologies as their first paper. Two major differences found in this second paper are that the authors have attempted to broaden their review of the research published by our profession by reviewing a total of six "premier" journals in our profession instead of just one, and they contrast their thematic findings with the topics identified in the recently published National Research Agenda (NRA) for Agricultural Education to identify what they call a "Research Gap" in our profession. The manuscript has a worthy goal even though the findings do not offer much in terms of promising conclusions or implications. It does, however, pose some very interesting questions for our profession.

Suggestion(s) For Improvement:

While it isn't necessarily a suggestion for "improvement", I question the authors' assumption that they have chosen six "premier" journals in our profession from which to identify our research themes. I understand the survey technique employed to identify what are probably the six journals in which our professionals most frequently submit their research for publication. However, to call all six "premier" research journals is probably a bit of an overstatement, at best. While I don't think many in our profession would argue that the *Journal of Agricultural Education* is indeed a "premier" research journal in our field, I'm not sure that the *Journal of Extension*, for example, would be considered a "research journal" at all. While it is an excellent journal, it is clearly a "practitioner's journal" that would probably reject 90 percent of the articles that were accepted for publication in the *Journal of Agricultural Education* because its readers are not researchers. Trying to identify major "research themes" from "research digests" or mini-articles written in "practitioners' journals" will not likely provide valid themes for research in our profession.

Implications:

If one agrees with the conclusions drawn by the authors, there is no "gap" between the research we publish and the research needs identified in the National Research Agenda. From that one may draw one of two conclusions: We are either doing an excellent job of prioritizing our research and publication, or the National Research Agenda is based on past history and not future needs. I don't think I will attempt to answer that question in this critique, but it will be interesting to see how the discussion proceeds in this session of our conference (smile).

FACTORS INFLUENCING FACULTY MIGRATION TO DEPARTMENT CHAIR POSITIONS IN COLLEGES OF AGRICULTURAL AND LIFE SCIENCES

A Critique by Randol G. Waters, Professor - University of Tennessee

Major Strength of the Paper:

This manuscript addresses an interesting topic that should cause some discussion within our profession: What causes academic faculty to move into administrative positions. The authors present a well developed theoretical framework for conducting the research that is based upon previous research by Bandura. They have chosen a population of "recently hired department chairs/heads" in colleges of agriculture and life sciences to participate in their study in an attempt to determine why they decided to "migrate" to the position of "department chair". The authors also substantiate a need for this study and others like it to determine how to best fill the needs of academia for leadership. While I have not read a lot of research on this topic, I found it very interesting.

Suggestion(s) For Improvement:

Since this is a clearly a census study, I do not understand the authors' use of the analysis of variance inferential procedure "on an exploratory basis to gain a better understanding of the data". The only thing this procedure can determine is the probability of differences observed in a "sample" truly existing in the "population" from which it was drawn. Since they state they are studying a population, I would suggest that this procedure adds nothing to the findings and any inferences drawn from significant values are meaningless.

Implications:

It is interesting and good to find that academic professionals appear to be moving into (staying in?) administrative roles for somewhat altruistic reasons like "they enjoy working with people" and "there is a need for better leadership in the department". It doesn't really surprise me to see that, in the long run, these reasons are more important to them than "prestige" and/or "financial incentive", even though I suspect that both of these variables provide some initial enticement, even though they certainly would not prolong one's stay in an administrative/leadership role where the "people were hard to work with" and "good leadership skill isn't valued by their superiors".

While it is not intended as a "criticism" of this manuscript, I wonder if you might be able to reveal more information about the relationship between perceptions of the role of department head and self efficacy, if you simply broke it into two discreet categories of "Similar" and "Different". (I wonder if there is truly a clearly defined five point continuum of difference that is developed over time.) I'm guessing that those who perceive the role "differently" would have lower self efficacy scores than those who perceive it to be essentially the same.

Throughout my years in academia, I have seen trends go one way and then another. While I think it is interesting to study why academics migrate "toward" leadership positions in their departments, I perceive that we are currently experiencing in many of our colleges of agriculture

and life sciences a trend where good department heads are migrating “away” from such positions and either retiring early or returning to the faculty.. I’m curious to know if there are many other colleges like mine where all but one of their department heads have recently stepped down to return to faculty positions.

HIGH SCHOOL PRINCIPAL'S CURRENT PERCEPTIONS REGARDING SUPERVISED AGRICULTURAL EXPERIENCE

John Rayfield and Elizabeth Wilson, North Carolina State University

Abstract

This study examined the perceptions and knowledge of high school principals at schools that have agricultural education programs with regard to Supervised Agricultural Experience. There is evidence that suggests that high school principal's attitudes may both directly and indirectly affect factors that influence school climate and student achievement. Examining principal's views of agricultural education programs as a whole and specifically the Supervised Agricultural Experience, may give some indication as to the climate in which those programs are conducted. This may be visible in the current success of those programs and indicate areas that need improvement. If we can understand what affects principal's perceptions, we can better address those attitudes and work toward improving the principal's views which in turn can strengthen the program. Understanding these concepts may resolve the conflicting perceptions between principals and agricultural education teachers related to Supervised Agricultural Experience.

Introduction

The origin of Supervised Agricultural Experience has been well documented by historians and scholars in Agricultural Education. This rich history is ingrained in the tradition of the Agricultural Education community and is a source of pride for those that acknowledge Supervised Agricultural Experience (SAE) as the first formal experiential learning model of instruction in Career and Technical Education.

However during the last forty years many studies have identified Supervised Agricultural Experience as the shrinking component of the Agricultural Education program (Berkey and Sutphin, 1985; Dunham and Long, 1984; Grellner and White, 1992; Iverson and Brown, 1979; Leising, 1982; Miller, 1980; Osborne, 1988; Vaughn and Cano, 1982; Zurbrick, 1984). Researchers have identified the Vocational Act of 1963 as the genesis of this trend (Boone, Doerfert, and Elliot, 1987). Dyer and Osborne (1995) conducted a synthesis of all research related to SAEs in which they identified the success of the Supervised Agricultural Experience component to be dependent upon the teacher. Dyer and Osborne also concluded from many studies that teachers value the foundations of Supervised Agricultural Experience but are not transferring this value into action by requiring students to participate in Supervised Agricultural Experience. More recently, Wilson and Moore (2006) found this still be true. In addition, North Carolina agricultural education teachers conduct an authentic assessment of their program by filling out a self reporting instrument at the end of the school year. In 2004-2005, only 37% of teachers and in 2005-2006, only 43% of teachers reported all students in their programs had a Supervised Agricultural Experience program.

The National Research Council (1988) called for increased involvement of school administrators to improve agricultural education programs in *Understanding agriculture: New directions for agriculture*. School principals can have an affect on the actions of teachers to implement Supervised Agricultural Experience in many ways. Jewell (1995) stated that administrators possess influence and authority at the school level that is necessary for their agricultural education programs to develop and grow. In North Carolina, high school principals make the majority of decisions regarding the hiring of teachers in their school. Weeks (2006) found 77% of principals in Oklahoma to be involved in the interviewing process of agricultural education teachers. School principals have a critical role in setting the school climate, which can nurture or deplete the desire of teachers to have their students conduct Supervised Agricultural Experience (Barth, 1984). The relationship between the teacher and the principal can affect the performance of the teacher (Thomas, 1997). In North Carolina, principals can also support or de-emphasize the importance of Supervised Agricultural Experience at their school in their annual evaluation of the teacher and the agricultural education program. Dyer and Osborne (1996) also concluded that opinions of administrators make a difference in the maintenance of agricultural education program quality.

Principals may have less experience with agricultural education programs as communities become less rural and connected with the agricultural industry. A recent positive trend in North Carolina includes legislation that requires schools to provide senior projects for all students. This requirement could be increasing principals' awareness of the benefits of experiential learning.

Theoretical Framework/Literature Review

The theoretical framework for this study is based on educational leadership theory. Pitner (1988) hypothesized in his mediated-effects framework that school leaders can affect school outcomes through direct and indirect paths. His mediated effects model, an adaptation of which is in (Figure1.) illustrates that principal leadership can influence student achievement through various intervening variables. Leithwood (1994) agreed that leaders can achieve indirect results by influencing intervening variables such as the school culture, instructional practices used in the classroom and teacher commitment. This model suggests that administrators who value Supervised Agricultural Experience could have an influence on the commitment and follow through of the teacher to have their students conduct Supervised Agricultural Experience. If principals have positive perceptions of Supervised Agricultural Experience, then these perceptions could indirectly increase student achievement. Related factors, that might influence differences in perceptions of principals and how they communicate their perceptions to teachers, could be used by state administrators to design and conduct programs to improve the perceptions of the principals and student achievement in agricultural education.

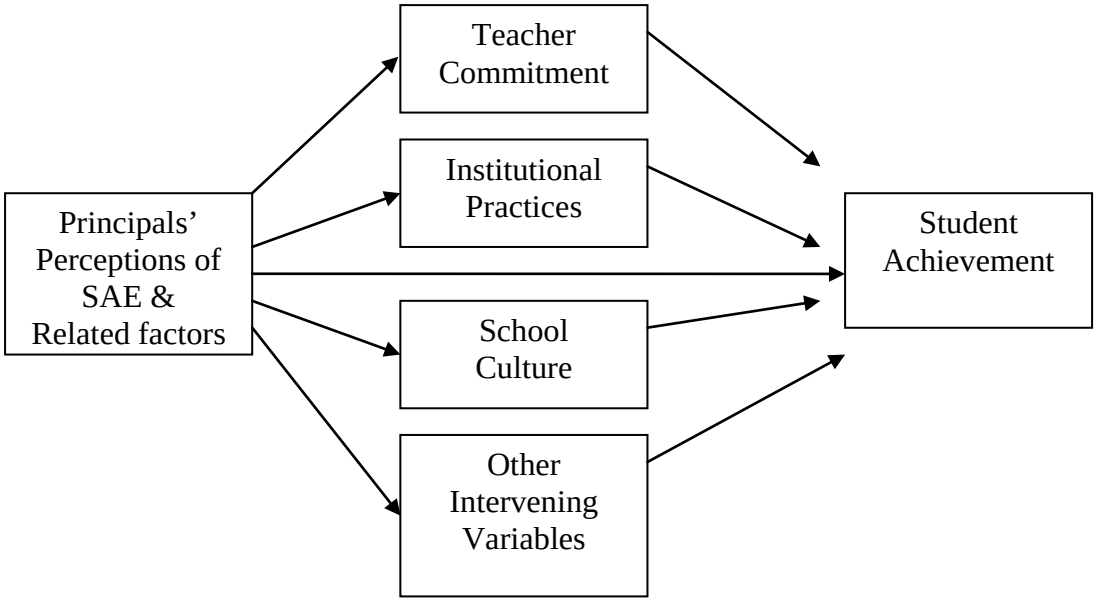

Fig. 1 Direct and Indirect Progression of Principal Perceptions on Student Achievement

Dyer and Osborne (1996) also created a theoretical model for conducting SAE research. The model includes the support and expectations of school administrators as one variable that should be studied in relation to the teacher's implementation, design, expectations, teacher effectiveness, supervision, teacher encouragement, incentives and evaluation of Supervised Agricultural Experience. This study contributes to the body of current SAE research by examining school administrator's support and expectations of teachers related to Supervised Agricultural Experience.

High school principals have been found to be generally supportive of agricultural education programs (Kalme and Dyer, 2000; Hinkson and Kieth, 1999; Price, 1990). However, Dyer and Osborne (1995) concluded from a synthesis of research that administrators possess mixed feelings regarding their value of Supervised Agricultural Experience. Principals have been found to have positive attitudes regarding Supervised Agricultural Experience in several studies (Almazan and Williams, 1983; Miller and Short, 1986; Rush and Foster, 1984). However other studies have been conducted which do not find that administrators possess positive perceptions or values related to Supervised Agricultural Experience (Similane and Lawrence, 1985; Makin and Miller; 1987; Gott, 1981).

Research related to the past experiences of administrators with agricultural education indicates that administrators have less direct experiences with agricultural experiences than ever before. In 1999, Hinkson and Kieth found that 61% of administrators in Texas had not been a member of the FFA. In 2004, Pavelock, Ullrich and Hanagriff found that 59% of Texas school superintendents and 66% of superintendent's children had not taken an agricultural education course.

Supervised Agricultural Experience participation is highest in rural area by white male students according to Dyer and Osborne (1996). Bobbitt (1986) found teachers promote Supervised Agricultural Experience more in rural agricultural education programs.

Wilson and Moore (1996) found that teachers perceive principals to reward FFA activities more than Supervised Agricultural Experience. In a focus group study conducted by Myers, Breja and Dyer in 2003, teachers and administrators perceived Supervised Agricultural Experience as record-keeping conduits for students to earn awards and that the experiential learning focus of the program component was not currently being conducted.

Purpose and Objectives

The purpose of the study was to identify and describe factors related to high school agricultural principals' perceptions of the Supervised Agricultural Education program.

More specifically, the study intended to answer the following research questions:

What current perceptions do principals possess regarding the importance and quality of Supervised Agricultural Experience?

Is there a difference in the current perceptions of Supervised Agricultural Experience for principals who were enrolled in a high school agricultural education course and those that were not?

Is there a difference in the current perceptions of Supervised Agricultural Experience for principals who lead a rural school and those that lead an urban school?

How do principals recognize their teachers for Supervised Agricultural Experience supervision and involvement in their schools?

Procedures

The population of this study was all high school principals (n = 206) in North Carolina that have agricultural education programs in their schools. The instrument was developed by the researchers and reviewed by a panel of seven university agricultural educators for content and face validity. After revisions the instrument was piloted by 40 principals in four southern states. Cronbach's Alpha was used to test the reliability of the instrument and was calculated to be .84. Invitations were sent to the principals in the population to participate in the internet survey. All principals were sent a reminder e-mail after seven days, 14 days and at 21 days. Dillman (2000) suggests that four contacts are sufficient when conducting e-mail surveys. Ninety-three principals responded to the survey yielding a 45% response rate. To control for non-response error the researchers classified respondents who had replied within 14 days as early respondents and all respondents who replied after 14 days as late respondents. No statistically significant differences were found between early and late respondents.

The data was tabulated using the Statistical Package for Social Sciences (SPSS) for Windows Version 11.5. A profile of the teachers was developed by an analysis of descriptive statistics. Descriptive statistics were generated for principals' age, years of experience, gender, school population, previous experiences as a teacher and student and rural/urban school location. Mean scores were tabulated for principal's perception of the importance of the SAE component of an agricultural education program and principal's perception of the quality of the SAE component of their agricultural education program. Mean scores for principals' responses to a series of statements related to teacher rewards for conducting the SAE component of their program was also calculated. Independent samples T-test were used to compare principals who had taken an agricultural education with those who had not as well as principals from rural versus urban populations. This comparison of mean scores was used to detect differences among the groups.

Findings

Demographics

Twenty-two percent of the principals are between the ages of 30-39. Thirty-one percent are 40-49 and 35% reported being 50-59 years old; only six percent were over age 59. The majority of respondents were male (73.2 %).

Over one third, 35%, of principals has been in that position for less than five years while only 18% reported being a high school principal for ten years or more. Although seventy-six percent of the principals taught at the high school level before their principalship, only 10% taught a career and technical education course at that level. While 16.5% of the principals who participated in the survey took an agricultural education course in high school, only 13.4% reported having a project, either placement or entrepreneurship.

The majority of these principals (70%) work at schools with medium to large student populations, those with 501-1500 students. Less than 10% were principals at schools with fewer than 500 students. Seventy-five percent of those surveyed indicated that the students at their school come from rural areas. Eighty percent of those surveyed reported that the agricultural education teacher(s) at their school are employed on 12 month contracts.

The principals in this study believe that Supervised Agricultural Experience is important and valuable. As seen in Table 1, principals agree that Supervised Agricultural Experience is important, realistic, and provides character education. They also believe that teachers should visit and supervise students conducting Supervised Agricultural Experience and teachers should possess 12 month contracts to do so.

Table 1

Principals' perceptions of the importance of Supervised Agricultural Experience

	M	*SD*
How would you rate the importance of work based learning experiences in an agricultural education program?	3.70	.53
I believe that personalized instruction in the form of work-based or project-based learning is a realistic form of education in schools today.	3.47	.56
I believe that work-based learning provides students the opportunity to learn character education through experience.	3.46	.54
I believe agricultural education teachers should be involved in visiting and supervising work-based learning experiences for their students.	3.46	.56
I believe agricultural education teachers should possess 12 month contracts so they can visit their students' work-based learning experiences during the summer months.	3.13	.79

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree

As seen in Table 2, principals believe that the level of the teacher's involvement with Supervised Agricultural Experience and the quality of these experiences is above average.
Only sixty-five percent of the principals surveyed reported that the agriculture teacher(s) at their school have students conducting work-based agricultural education experiences. However only 5.2% think those work-based agricultural education experiences are available to all of their agricultural education students. Nearly 20% of these principals state that their agricultural education teacher(s) provides work-based learning opportunities for 25% or less of their students. Only five percent of the principals surveyed believe that the agricultural education teacher(s) at their school provides work-based learning opportunities for 100% of their students.

Even though principals believe in the importance and quality of Supervised Agricultural Experience they do not believe teachers are visiting or grading the majority of student projects. Only forty percent of the principals surveyed believe the agricultural education teachers at their school visit and supervise work-based learning experiences for a majority of their students. Fifty percent of those principals who reported having programs with work-based learning agricultural education programs said that their agricultural education teachers give students grades for their projects.

Table 2

Principals' perceptions of the quality of Supervised Agricultural Experience at their school

	M	*SD*
At what level do you perceive the agricultural education teacher(s) at your school to be involved with student work-based experiences?	3.74	1.03
I perceive the quality of work-based learning experiences provided by the agricultural education program at my school to be:	3.67	.94

Note. Scale: 1 = very low quality, 2 = low quality, 3 = medium quality, 4 = high quality, 5 = very high quality

A T-test for independent samples was used to compare principals who had taken an agricultural education course to those who had not on their perception of the importance of Supervised Agricultural Experience. As seen in Table 3 there were no significant differences between the two groups. Principals who had not taken an agricultural education class had higher mean scores than principals who had taken an agriculture class.

Table 3

Differences in principal's perception of SAE importance based on their high school agricultural education enrollment

	n	*M*[a]	*SD*	*t*	*Sig*
How would you rate the importance of work-based learning experiences in an agricultural education program?	16	3.63	.619	-.556	.579
	75	3.71	.514	-.493	.628
I believe agricultural education teachers should be involved in visiting and supervising work based learning experiences for their students	16	3.31	.602	-1.167	.246
	75	3.49	.554	-1.106	.282

[a] Scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important
N = 91 Agriculture class = 16, No Agriculture class = 75

Again a T-test for independent samples was used to compare principals who work in an urban school to those who work in a rural school on their perception of the importance of Supervised Agricultural Experience. As seen in Table 4 there were no significant differences between the two groups. Principals from urban populations posted higher a higher mean score on their perceptions of the importance of SAE in agricultural education.

Table 4

Differences in principal's perception of SAE importance based on the rural/urban location of the school

	n	*M*[a]	*SD*	*t*	*Sig*
How would you rate the importance of work-based learning experiences in an agricultural education program?	73	3.67	.554	-.866	.389
	19	3.79	.419	-1.020	.315
I believe agricultural education teachers should be involved in visiting and supervising work based learning experiences for their students	73	3.44	.552	-.605	.547
	19	3.53	.612	-.569	.574

[a] Scale: 1 = not important, 2 = somewhat important, 3 = important, 4 = very important
N = 92 Rural = 73, Urban = 19

Principals' Perception of how Teachers are Rewarded for Conducting SAE

The majority of principals do not recognize their teachers for conducting Supervised Agricultural Experience. Twenty-nine percent of the principals reported that they recognize their agricultural education teacher's involvement in Supervised Agricultural through face to face support. Only 10% recognize their teachers' Supervised Agricultural efforts in their annual teaching review and surprisingly only 5% recognize these efforts during the agricultural education program evaluation.

Conclusions

Very few principals took an agricultural education course in high school and even fewer conducted a Supervised Agricultural Experience in high school. It is encouraging that without prior exposure to agricultural education courses, these principals consider Supervised Agricultural Experience programs to be important. The principals also believe that their agricultural education teachers should be active in supervising and visiting students with Supervised Agricultural Experience programs. Most schools that have an agricultural education program in North Carolina still serve a rural population but the percentage of urban programs is growing. Another promising conclusion is that the principals who serve in urban settings in this state have an appreciation for Supervised Agricultural Experience and believe that agricultural education teachers should take an active role in visiting and supervising student projects. We must use caution in interpreting the differences between principals who took an agricultural education course and those who did not as well as the rural versus urban school principals. The number of principals who took an agricultural education course and the number of principals from urban areas are substantially smaller than the groups they are compared to.

Principals do not believe agricultural educators provide Supervised Agricultural Experience to all students but they believe the programs that are being conducted are of better than average

quality. They agree that teachers should possess 12 month contracts but the majority do not believe that their teachers are visiting students during the summer months.
Further research is needed to determine if teachers are not visiting students with Supervised Agricultural Experience projects or if they are just neglecting to communicate their summer visits to their principals. Another aspect of project supervision that warrants future research is the supervision patterns of agricultural education teachers during the school year. Most agricultural education teachers justify their extended year contracts through Supervised Agricultural Experience. Is it possible that supervised agriculture experience supervision is neglected by teachers year round and not just in the summer months?

Principals currently perceive Supervised Agricultural Experience to be important for students in their schools. There are no differences in these perceptions between the groups of principals that have had an agricultural education course and those that did not take a high school agricultural education course. In addition there are no differences in their perceptions whether they lead a school in an urban or rural area. If administrators indirectly influence student achievement as Pitner hypothesized, this is good news for agricultural education since less principals have less experience with agricultural education than in the past and more principals are leading schools in urban areas.

Wilson and Moore (1996) found that teachers perceive principals to reward FFA activities more than Supervised Agricultural Experience. This study supports those findings. School principals do not recognize their teachers for conducting Supervised Agricultural Experience. Principals need to express their value of Supervised Agricultural Experience to their teachers. National and state staff should consider award recognition programs so that administrators have more avenues for expressing their value and recognition of the teacher for conducting Supervised Agricultural Experience.

Discussion/Implications/Recommendations

Trede and Russell (1999) found that a group of urban stakeholders believed urban agricultural education teachers should emphasize Supervised Agricultural Experience. Urban administrators in this study felt the same. However, as our urban principals become more removed from agricultural and rural communities, we should consider developing new marketing tools that utilize more urban images targeted at an audience with no background in agricultural education.

FFA programs that recognize the current Supervised Agricultural Experience of agricultural education students are the FFA proficiency award program and the agriscience fair and FFA Star student recognition program. The agricultural profession needs to reinforce, through incentive programs, that Supervised Agricultural Experience is of equal value as FFA and classroom activities. Further research should be conducted to determine if administrators would give teachers more rewards and recognition for Supervised Agricultural Experience if their teachers were given more outside recognition at the state and national level. We must continue to examine positive actions that can be taken to get teachers and administrators to act on the positive value they possess of Supervised Agricultural Experience.

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DEFINING UTILIZATION OF THE TEXAS AGRICULTURAL SCIENCE RECORD KEEPING SYSTEM ACCORDING TO STAKEHOLDER INSIGHT: A DELPHI STUDY

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This study was developed to determine teacher perceptions related to the Texas agricultural science record keeping system, and to determine the intended purpose and outcome of the agricultural science record keeping system according to a selected panel of experts in Texas. Area coordinators who represented the entire state, recommended panel members who they believed would best serve the objectives of the study. A modified Delphi approach was used to obtain the perceptions of panel members concerning the agricultural science record keeping system; recommendations are offered based on those findings.

Introduction

Education in Texas is an ever evolving entity seeking to improve the academic advancement of the state's youth (Garcia, 2000). From classroom enrichment activities, grade level benchmark tests, to end of course final examinations, stewards of our youth spend countless hours preparing quality educational experiences designed to prepare young people to excel as adults. This responsibility is not to be taken lightly, and has been a platform for change on both the state and national stages (Texas Politics, 2006).

Agricultural education is a valid curriculum option that is key in educating our youth to be successful not only in the arena of high stakes testing but more important in education itself not only in a vocational setting but in preparation for a successful college experience (Riesenberg & Lancaster, 1990). No Child Left Behind (NCLB) has become the primary force behind "teaching to the test," and has had a "distorting effect" on traditional teaching and learning methods because of increased pressure to raise high stakes test scores in the public school system (Gulek, 2003). Agricultural education utilizes a variety of ways to reinforce student learning. Utilizing a "Learning by Doing" philosophy (National FFA Organization, 2006), agricultural education in Texas employ a documentation system that allows for student success in a variety of ways. This documentation system is known as the agricultural science record keeping system (Instructional Materials Service, 2006). The system allows for student success by documenting the student's supervised agricultural experience (SAE) and offering a degree of responsibility by instilling the importance of accurate records in relation to the SAE program. Student success can be realized in the form of advanced degrees in the FFA program, such as the state and American FFA degree proficiency awards that encourage in depth study in over 47 agricultural areas (National FFA Organization, 2007), and scholarship opportunities on both the state and national levels (Texas FFA Association, 2007; National FFA Organization 2007).

The Texas Education Agency (TEA) is the primary state organization responsible for public school education in Texas. Although the TEA was not formally established until 1949, passage of the Gilmer-Aikin act created the Foundation School Program; some of the first school accreditations occurred in 1885 when schools sent selected test papers for examination by the

faculty at the University of Texas (TEA, 2006). With this giant leap toward uniform student learning, any school whose students were found to be satisfactory were considered to be affiliated with the University and graduates were accepted into the college without any further series of examinations (TEA, 2006). This set into motion the groundwork for future statewide testing used in Texas classrooms today. Today, in Texas, the main instrument used to determine the eligibility of students to advance educationally are standardized test known as Texas Assessment of Knowledge and Skills (TAKS) (2006).

Passage of the *No Child Left Behind* Act (NCLB)(2001) was the start of a major national crusade affecting educational setting in the United States. NCLB is the catalyst behind school testing and accountability and has, in effect, changed the way learning occurs in many classrooms (Gulek, 2003). Today, state testing has become the key indicator determining if school success has occurred in the form of adequate yearly progress (AYP). The penalties that can be associated with not meeting AYP include informing the board of trustees of the deficiency by public notice, a management team being appointed by the state for the school district, and placing a campus intervention team on the campus in question in the most serious of situations (TEA, 2006).

Theoretical/Conceptual Framework

"Situationism," (Lave and Wenger, 1991), shows how the agricultural science record keeping system allows students to learn through a process of engagement in "communities of practice." Wenger (1998) defined communities of practice as a three dimensional function that includes 1) what it is about, by continually defining the community according to the preferences of its members, 2) how it functions, by creating an entity that finds participation by all of its members, and 3) what capability it has produced depending on the vocabulary, routines, and styles the group has developed through the community practice. This paradigm allows learning through engagement in activities whether in the core or the fringes of the activity. Through documentation of the activities associated with a students' SAE, a student is actually reinforcing the learned activity first by the engagement process, and secondly, by the documentation of it. The agricultural science record keeping system allows students the opportunity to document what they have learned through the course of their supervised agricultural experience, and apply this knowledge in multiple areas.

The current form of record keeping system came into use in the 2000-2001 school year. It followed a four-year transition period to allow student users the opportunity to complete their SAE documentation under the old system (2003). The new documentation system allowed for a uniform record keeping system that encompassed traditional SAE programs, work-based learning, and agricultural industry programs by moving to an hourly based system of documentation instead of the traditional point accumulation system (Agricultural Science and Technology, 2003). The current version of the record keeping system in use in the state include the ACRO SAE records software available through CEV Multimedia (CEV Multimedia, 2007), and the Instructional Materials Service (IMS) paper based version and online version record book system and the excel template available for computer use. (IMS, 2006).

The record keeping system allows students multiple opportunities to write in courses describing their Supervised Agricultural Experience. By documenting their thoughts in résumés,

crafting well thought out similes in a journal of activities, and describing their partnership/rental/lease/loan agreements required in the efficiencies attained section of the record keeping system (IMS, 2006), students are afforded many opportunities to describe, in written reflection, various aspects of their agricultural education experience. In a study by Reaves, Flowers, and Jewell (1993), it was found that writing can be a valuable tool in learning subject matter, including agricultural content, when reflective writing is used as part of the learning process.

Programs and disciplines other than agricultural science also enjoy the benefits of record keeping in their everyday activities. Four-H programs use a form of record keeping to assist in keeping track of the different types of project opportunities that exist (Washington State University, 2007). Record keeping in the aspect of personal training and fitness allows athletes the opportunity to benefit from maximum results due to their record keeping skills. Whether involving conditioning programs or competitive areas, record keeping serves as a valuable tool (Riley & Arapoff, 1998). When this belief is applied to supervised agricultural experience programs in agricultural science, students benefit in the same way and are able to apply the skills they have learned in useful ways.

The record keeping system, when combined with a supervised agricultural experience program, can be an opportune way to gain a practical learning experience that will allow the student to reinforce the objectives that have been learned. By empowering students with the opportunity to see what the results of their Supervised Agricultural Experience can bring them through the use of the record keeping system. In addition, reinforcement of scientific and mathematical skills may be obtained in core courses with this form of state required documentation (Dillingham, Wendt, & Williams, 2004).

If secondary agricultural education serves is a curriculum whereby scientific and mathematical principles can be honed and sharpened in support of core studies, then documentation of these learned principles in the Texas Supervised Agricultural Experience Record Keeping System may additionally reinforce what has been learned. According to the National Research Council (1996), “what students learn is greatly influenced by how they are taught” (p.28), and “the benefits of educational innovations are never fully realized until the teacher in the classroom adopts and implements the changes” (Rudd & Hillison, 1995, p.19).

Is the state agricultural science record keeping system being taught such that students gain a full understanding of its benefits, or is this system used primarily as a medium to apply for the benefits of the FFA program, without any true knowledge being learned about record keeping? It is through this study that the researcher intended to answer these questions by examining the responses of a selected panel of experts.

Purpose and Objectives

The purpose of this study was to determine teachers’ perceptions about use of the agricultural science record keeping system. The specific objectives for the study were to determine the intended purpose of the agricultural science record keeping system according to a selected panel of experts, and to determine the intended outcomes of the state record keeping system according to the panelist.

Procedures

The design for this study was descriptive, and its population consisted of a select panel of experts (N = 41), that included individuals who were perceived to be experts about teachers' use of agricultural science record keeping systems in Texas. This population included selected members of the Texas FFA Association and TEA staff, area coordinators from the 10 area FFA associations, 2 area coordinators, expert teachers from each area who were recommended by their area coordinator, and 10 representatives from the agricultural education degree granting institutions in Texas. The panel of experts was selected with the purpose of offering equal representation from each FFA administrative area in Texas.

The panel of experts was sent a researcher-designed, three round Delphi questionnaire and data were collected that identified perceptions of the intended purpose and outcomes of the agricultural science record keeping system. The data were organized and delivered to the panel through the use of an online data collection service used by the Tarleton State University Office of Sponsored Projects.

The participants responded to an electronic mail invitation to participate. They were asked to reply to a three round Delphi instrument that included five open-ended questions that sought to determine the experts' perceptions of teachers' use of the agricultural science record keeping system. The Delphi method of research was employed because it is a reliable process to achieve a panel consensus to support or refute a position or assumption held by a researcher (Delp, Thesen, Motiwalla, & Seshadri, 1977). The Delphi technique has also been described as a way to reach a group consensus on a majority opinion that has been agreed upon and refined through the survey process (Helmer, 1966). This is considered to be the best way to obtain a consensus from an intentionally selected panel of experts (Stufflebeam, McCormick, Binkerhoff, & Nelson, 1985). Round one of the instrument included the following items: 1) describe the intended purpose of the state record keeping system, 2) describe the intended outcomes of the state record keeping system.

The questions for round one were developed with input from faculty members of the Department of Agricultural Services and Development, Tarleton State University, and were open-ended in nature so that statements for the subsequent rounds could be developed. Questions were validated through the researcher's thesis committee; The responses from round one were organized and arranged in order of importance, according to the expert panel, to prepare items for round two. In the second round, the panel of experts were asked to rate the responses from each open-ended question from round one according to a five point Likert-type scale; 0 = Strongly Disagree, 1 = Disagree, 2 = Uncertain, 3 = Agree, 4 = Strongly Agree. Cronbach's coefficient alpha reliability overall estimates for the round two questionnaire was .88. The panelist responses generated from the second round were used to prepare a third round of modified statements so group consensus could be determined. The panelists were asked to agree or disagree with the statements provided in round three and were asked to comment on the statements if they did not agree with the group's consensus. Cronbach's coefficient alpha reliability estimate for round three questionnaire was .82.

The initial response rates by the panel for the three rounds of the study are as follows. Round one, which asked the panel to respond to two open-ended questions, had the following

response rate. Area coordinators and coordinator recommended panel members, 66%, teacher educators, 60%, state staff, 50%. Round two, which asked panel members to respond to statements derived from round one, had the following response rate, area coordinators and coordinator recommended panel members, 74%, teacher educators, 100%, state staff, 100%. Finally, round three, which asked panel members to respond to statements derived from round two, had the following response rate, area coordinators and coordinator recommended panel members, 79%, teacher educators, 67%, state staff, 100%.

Twenty-seven panel members responded to the first round of questions. The second round of the study found 78% or 21 panel members participating. Sixteen or 76% of the panel members completed the third round of the study. The response rates for the study were determined reliable and valid according to a study by Dalkey (1969), who stated that 13 responses are necessary in the Delphi process to produce a minimum reliability score of r=.80.

Results from each round were evaluated by faculty members from Tarleton State University, Department of Agricultural Services and Development in preparation of subsequent rounds of the study. The data from round two were analyzed for each item using means and standard deviations in accordance with the following scale: Strongly disagree (0.00-0.49), disagree (0.50-1.49), uncertain (1.50-2.49), agree (2.50-3.49), and strongly agree (3.50-4.00). Each Likert-type scale descriptive was assigned a numerical mean range to assist in the determination of the level of agreement of panel responses. The scale used was based on the scale used by Dyer, Breja, and Ball, 2003. The statements that were included in round three of the study were determined according to the mean score they received from panelist in round two. Those statements that had a mean score of 1.49 or lower were not included in the final round of the study. Statements included in the final round were evaluated according to the percentage of agreement received through panel input, and this was the determining factor in the final perceptions of the panel in the study (2003).

Findings

Panel members were asked the following question: describe the intended purpose of the state record keeping system. The question generated 27 responses which yielded 11 statements to be used in the design of round two. The most common responses included the following: 1) To have a consistent method of comparing student records; 2) To teach students best practices in financial record keeping, analysis, and interpretation; to serve as a learning tool by which students can record and then reflect on their learning activities and accomplishments. The statements for the second round are found in Table 1.

Table 1
Describe the Intended Purpose of the State Record Keeping System

Panelist Perceptions
Have a consistent method of comparing student records
Ensure accurate records of a student's SAE
Record and document a student's involvement in SAE and FFA activities
Keep track of daily management practices and decisions
Document student accomplishments used when applying for awards, degrees and scholarships
Teach students responsibility
Hold schools accountable for the state mandates for supervised project programs and course credit
Develop good documentation and organizational skills
Allow the record keeping process to be accomplished in an electronic format
Help students build an understanding of financial skills and the importance of keeping records
Document student accomplishments for employment purposes

The second item submitted to the panel, "Describes the intended outcomes of the state record keeping system," generated 27 responses and provided 16 unduplicated statements to be used in round two. The two most frequently submitted responses were: 1) Financial record of transactions, efficiency factors, change in net worth, etc. 2) Personal record of accomplishments and activities by which students can then reflect and learn and teachers can use as a platform for teachable moments. The statements generated for the second round are found in table 2.

Table 2
Describe the Intended Outcomes of the State Record Keeping System

Panelist Perceptions
Supply a financial record of transactions, efficiency factors, and an accurate idea of net worth
Provide a record of activities and accomplishments for students to learn and reflect by
Provide teachers a platform for teachable moments
Enable students to understand and apply proper record keeping procedures
Enable students to understand the importance and benefits of proper record keeping procedures
Learn both the skill and knowledge bases of financial record keeping in the business world
Learn the terminology of financial record keeping as it applies to agricultural enterprises
Have a record book ready to apply for scholarship, proficiencies, and star awards
Obtain advanced awards and honors
Provide students a means of determining remedies for mistakes made in their SAE
Produce documentation of outside classroom hours
Supply an opportunity for the student to develop life skills such as financial, time management and responsibility
Provide a more uniform system of record keeping
Document a student's SAE
Document a student's educational experiences
Provide accountability in student achievement and success

The second round of the Delphi used a five point Likert-type rating scale to further define the perceptions of the participants. In question number one, panel members were asked to respond to the statements concerning the intended purpose of the state record keeping system (Table 3).

Table 3
The Intended Purpose of the State Record Keeping System

Panelist Perceptions	*M*	*SD*	Level of Agreement [a]
Record and document a student's involvement in SAE and FFA activities	3.62	.50	Strongly Agree
Document student accomplishments used when applying for awards, degrees and scholarships	3.62	.50	Strongly Agree
Ensure accurate records of a student's SAE	3.24	.70	Agree
Teach students responsibility	3.24	.70	Agree
Help students build an understanding of financial skills and the importance of keeping records	3.10	1.38	Agree
Allow the record keeping process to be accomplished in an electronic format	2.95	.87	Agree
Develop good documentation and organizational skills	2.90	1.04	Agree
Have a consistent method of comparing student records	2.86	1.11	Agree
Hold schools accountable for the state mandates for supervised project programs and course credit	2.67	1.11	Agree
Keep track of daily management practices and decisions	2.67	1.00	Agree
Document student accomplishments for employment purposes	2.62	.87	Agree

[a] *Strongly Disagree = 0.00-0.49, Disagree = 0.50-1.49, Uncertain = 1.50-2.49, Agree = 2.50-3.49, Strongly Agree = 3.50-4.00*

Panel members indicated that “Recording and documenting a student’s involvement in SAE and FFA activities” as well as “Documenting student accomplishments used when applying for awards, degrees, and scholarships” were the most important intended purposes of the state record keeping system. Both statements yielded a mean of 3.62, (SD=.50). The second most important set of statements with a mean of 3.24, (SD=.70) were statements “Ensure accurate records of a student’s SAE” and to “teach student’s responsibility.” Panel members also agreed that, “Help students build an understanding of financial skills and the importance of keeping records” to be of a level of importance sufficient enough to rank as one of the top three sets of perceptions regarding the intended purpose of the state record keeping system. Although it had a high standard deviation of 1.38, it produced a mean rating of 3.10, which indicated a high level of agreement among the panel members. Other perceptions determined by the panelist as defining the intended purpose of the state record keeping system included, “Allow the record keeping process to be accomplished in an electronic format,” “Develop good documentation and organizational skills,” “Have a consistent method of comparing student records,” “Hold schools accountable for the state mandates for supervised project programs and course credit,” and “Keep track of daily management practices and decisions.” The lowest level of agreement with a

mean of 2.62, and a standard deviation of .87 was received by "Document student accomplishments for employment purposes." The range of mean ratings for all statements offered by the panel was 2.62 to 3.62, which meant that all statements were classified as "agree" or "strongly agree" according to the scale used.

In question number two, panel members were asked to respond to statements concerning the intended outcome of the state record keeping system. The mean ratings of the panelist fell in the range of 2.14 to 3.48, with only one statement "Provide students a means of determining remedies for mistakes made in their SAE-ranking" as uncertain (Table 4).

Table 4:
The Intended Outcome of the State Record Keeping System

Panelist Perceptions	*M*	*SD*	Level of Agreement [a]
Document a student's SAE	3.48	.51	Agree
Have a record book ready to apply for scholarship, proficiencies, and star awards	3.33	.73	Agree
Provide a record of activities and accomplishments for students to learn and reflect by	3.19	.60	Agree
Obtain advanced awards and honors	3.14	.85	Agree
Enable students to understand the importance and benefits of proper record keeping procedures	3.10	1.00	Agree
Enable students to understand and apply proper record keeping procedures	3.05	1.16	Agree
Supply an opportunity for the student to develop life skills such as financial, time management and responsibility	2.95	.67	Agree
Provide a more uniform system of record keeping	2.95	.92	Agree
Document a student's educational experiences	2.95	.59	Agree
Learn the terminology of financial record keeping as it applies to agricultural enterprises	2.86	1.01	Agree
Learn both the skill and knowledge bases of financial record keeping in the business world	2.81	.81	Agree
Supply a financial record of transactions, efficiency factors, and an accurate idea of net worth	2.81	.75	Agree
Produce documentation of outside classroom hours	2.71	1.01	Agree
Provide accountability in achievement and success.	2.71	.90	Agree
Provide teachers a platform for teachable moments.	2.57	.68	Agree
Provide students a means of determining remedies for	2.14	1.06	Uncertain

[a] *Strongly Disagree = 0.00-0.49, Disagree = 0.50-1.49, Uncertain = 1.50-2.49, Agree = 2.50-3.49, Strongly Agree = 3.50-4.00*

The highest level of agreement with a mean of 3.48 (SD = .51) was to "Document a student's SAE." All but one of the remaining responses fell between means of 3.33 to 2.57

followed by the lowest score of 2.14 which was "provides students a means of determining remedies for mistakes made in their SAE" (Table 4).

The final round sought to determine the perceptions of the panelist by asking them to indicate whether they "agreed" or "disagreed" with the statements that resulted from the previous rounds. Respondents were asked to provide input concerning any of the statements that needed to be changed to better clarify their intent. Each statement that was the direct result of a previous round was ranked according to percentages of agreement determined by panelist responses. The statements that were included in round three of the study were determined according to the mean score they received from round two. Those statements that had a mean score of 1.49 or lower were not included in the final round of the study.

Statements included in the final round were evaluated according to the percentage of agreement received through panels' input, and this was the determining factor in the final perceptions of the panel in the study (Dyer, Breja, & Ball, 2003).

The initial panel item from round one, "The intended purpose of the state record keeping system," found 11 statements that the panel formed a level of agreement with by the final round. Of the 11 statements, two had an agreement level of 100%. These statements include "Record and document a student's involvement in SAE and FFA activities" and "Document student accomplishments used when applying for awards, degrees and scholarships" (Table 5).

Table 5:
The Intended Purpose of the State Record Keeping System – Round Three

Panelist Perceptions	Agree (%)	Disagree (%)
Record and document a student's involvement in SAE and FFA activities	100.00	0.00
Document student accomplishments used when applying for awards, degrees and scholarships	100.00	0.00
Teach students responsibility	93.75	6.25
Develop good documentation and organizational skills	93.75	6.25
Ensure accurate records of a student's SAE	87.50	12.50
Help students build an understanding of financial skills and the importance of keeping records	81.25	12.50
Have a consistent method of comparing student records	75.00	25.00
Hold schools accountable for the state mandates for supervised project programs and course credit	75.00	25.00
Allow the record keeping process to be accomplished in an electronic format	68.75	25.00
Keep track of daily management practices and decisions	62.50	37.50
Document student accomplishments for employment purposes	62.50	37.50

Panel members also agreed by 93.75% that "teaching student's responsibility," as well as 'the development of good documentation and organizational skills" was a direct purpose of the state record keeping system. More than 80% of the panel found that "ensuring accurate records of a

student's SAE" and "helping those students to understand the financial skills as well as the importance of keeping records" to be a purpose of the state record keeping system. The remaining five responses received 75% agreement or less. The initial panel question from round one, "The intended outcome of the state record keeping system," found sixteen statements as a direct result from the previous two rounds of the Delphi. These sixteen statements generated thirteen responses above the 80% range of agreement for this item. Two of the statements received 100% agreement. These included "the student's having a record book system that was ready when it was time to apply for scholarships, proficiencies, and star awards," and also "being ready to obtain any other types of advanced awards and honors." Four of the perceptions held by the panelist had an approval rate of 93.75%; while seven responses hold an 80% or above. "Documenting a student's educational experiences" was agreed upon by 75% of the panel members, and more than 60% of the panel determined that the intended outcome of the state record keeping system was that it "provided students a way to determine and remedy mistakes made in their SAE." The final perception of the panel concerning this statement was that "the state record keeping system provides teachers a platform for teachable moments. Only 50% of the panel was in agreement to this response (Table 6).

Table 6:
The Intended Outcome of the State Record Keeping System – Round Three

Panelist Perceptions	Agree (%)	Disagree (%)
Have a record book ready to apply for scholarship, proficiencies, and star awards	100.00	0.00
Obtain advanced awards and honors	100.00	0.00
Document a student's SAE	93.75	6.25
Provide a more uniform system of record keeping	93.75	6.25
Produce documentation of outside classroom hours	93.75	6.25
Provide accountability in student achievement and success	93.75	6.25
Enable students to understand the importance and benefits of proper record keeping procedures	87.50	12.50
Enable students to understand and apply proper record keeping procedures	87.50	12.50
Supply an opportunity for the student to develop life skills such as financial, time management and responsibility	87.50	12.50
Provide a record of activities and accomplishments for students to learn and reflect by	81.25	18.75
Learn the terminology of financial record keeping as it applies to agricultural enterprises	81.25	18.75
Supply a financial record of transactions, efficiency factors, and an accurate idea of net worth	81.25	18.75
Learn both the skill and knowledge bases of financial record keeping in the business world	81.25	18.75
Document a student's educational experiences	75.00	18.75
Provide students a means of determining remedies for mistakes made in their SAE	68.75	31.25
Provide teachers a platform for teachable moments	50.00	50.00

Conclusions

Conclusions of this study are based on the perceptions of expert panelist statements who chose to participate in each round of the Delphi study concerning the state record keeping system.

Concerning objective one, the Delphi panelist (87.5%) indicated that the intended purpose of the state record keeping system was that it be used as a documentation method for student involvement in SAE and FFA activities and serve as a vehicle for advanced awards and scholarships. However, the record keeping system is intended to instill a sense of responsibility, while providing the documentation and organizational skills necessary for future success. The panel agreed that the record keeping system was useful in keeping track of daily management practices and decisions, but this was only at a 62.5% level of agreement. According to Phipps (1980), one of the reasons for keeping accurate records is to discover weaknesses in individual programs and determine what practices should be changed to improve efficiency in the student's supervised occupational experience. These statements should both have a higher percentage of agreement if active education is occurring in the record keeping system in areas other than simply as a tool for advanced awards and scholarships. This finding was also contradictory according to Binkley and Hammonds (1970), who determined that by keeping accurate records a student would have the capability to determine how efficient a program experience was as well as what the strong and weak points were.

The panelist perceptions showed that the intended outcomes of the state record keeping system virtually mirrored its intended purpose of a record book that was ready to apply and obtain advanced awards and scholarships. While providing a more uniform system of record keeping, documentation and accountability in student achievement and success in their SAE programs appear to be primary outcomes of the state record keeping system. The statement that the state record keeping system provided teachers a platform for teachable moments, was determined as being an uncertain perception according to the panel. Phipps (1980) asserted that teachers can use records effectively in classroom instruction at appropriate times in the curriculum. So, it would seem that the record keeping system would indeed serve as a tool to support instructional curriculum.

Recommendations

Further studies should be conducted that would define the purposes of the state record keeping system. Extensive instruction by teacher educators should occur in student teaching block courses further defining the intended purpose of the record keeping system. In-service opportunities dedicated to instruction in recording keeping systems should occur at professional development conferences and regional service centers in the state.

The panel of experts has primarily viewed the state record keeping system as an ends and means for students to receive advanced degrees, awards, and scholarships. In-service opportunities need to be developed that will target educators with the additional educational benefits that the state record keeping system has to offer. As an educational tool, the state record keeping system should not only serve those students who are active in the FFA program, but also at the students who populate our classrooms. The panel of experts was uncertain as to the

perception that the state record keeping system would serve as a viable platform for teachable moments. Most educators have historically used personal experiences and observations as a preparatory point for further educational discussion. Should not the state record keeping system also be used to enhance other educational objectives, and not just as a means of satisfying the documentation requirements of an SAE? Curriculum should be developed that aligns with the TEKS of agricultural science and technology coursework and the record keeping system. Curriculum that stressed "teachable moments" should be compiled in an educational format that could be distributed to educators at the state professional improvement conference. Instructors may be more willing to use the curriculum if it was provided electronically.

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Examining iPod Use by Texas Agricultural Science and Technology Teachers

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Abstract

The purpose of this study was to establish baseline data for adoption of iPod and mp3 technologies by agricultural science and technology teachers. The population consisted of all agricultural science and technology teachers in Texas. A sample of 310 was randomly drawn from the population. Study findings reveal that while agricultural science and technology teachers have knowledge of iPods, mp3 players and related technologies, there is little support for them to actually create their own podcasts, use them in the classroom, or promote them for student use. It was concluded that teachers were generally "late adopters" or "laggards," while students were "innovators" or "early adopters." Both teachers and students alike have access to computers and internet connections with a large number of teachers reporting that students own iPods or mp3 players which could be utilized for academics. Teachers reported strong interest in pre–produced curricula and FFA materials, particularly for training materials for Career Development Events, which could be used on iPod or mp3 players. Recommendations for encouraging teacher adoption and use of iPods, mp3, and related technologies were provided.

Introduction & Theoretical Framework

The study of technology adoption and distance education across agricultural education is not new. This area has been looked at closely in regard to the adoption of distance education technologies, barriers to technology adoption, and educational effectiveness at both the university and high school level. However, what is new and constantly changing is the technology itself. iPod, mp3, and related technologies offer portabilty and flexibility of content like never before. As shared by Donnelly and Berge (2006), podcasting, which is a method to disseminate audio content on both computers and devices such as MP3 players, provides an opportunity to "…cut through the dense text of the Internet and offers a human connection during distance training" (n.p.). Students are able to download and take content with them to be viewed at a time and place of their choosing. However, access to content provided in this manner is limited to the content that teachers select to provide.

Historically, university departments of agricultural education have often chosen to adopt technologies that are perceived to benefit students. Roberts and Dyer (2005b) reported that "over two–thirds of the agricultural education departments offered distance education courses" (p. 79). Additional studies (Murphrey & Dooley, 2000; Nelson & Thompson, 2005; Swan, Jackman, & Grubbs, 2005) reported demand for courses and programs delivered at a distance through technology. While demand for distance education courses was found to be moderately high – support to create and deliver these courses appeared to be much lower (Roberts & Dyer, 2005b). Given that teachers often teach as they are taught – it is possible that agricultural science and

technology teachers that are taught using technology might select to use technology as a teaching tool in the future. In addition, studies often fail to articulate the exact kind of technology being utilized within distance education settings, selecting instead to refer to distance education as a whole.

Regardless, the use of technology in public education continues to increase. EducationSector (2007) reported that 139,622 students were enrolled in State Virtual Schools during 2005–06, with the majority of students being enrolled in Utah and Florida. More than half of these students were enrolled in virtual high schools. While as early as 2001, a special U.S. News guide to distance education reported that more than 2000 institutions were providing not only courses but entire degree programs online (Shea & Boser). In addition, Dziuban, Moskal, and Brophy (2007), share that "[a] casual observation reveals that Net Generation students immerse themselves in pursuits involving digital media that are becoming increasingly portable" (p. 92). Thus, expectations for the use of technologies such as portable devices within public education settings may very well continue to increase.

Barriers to using instructional technologies have been examined by multiple researchers (Berge, Muilenburg, & Haneghan, 2002; Gammill & Newman, 2005; Murphrey & Dooley, 2000; Nelson & Thompson, 2005). Barriers often include lack of release time to develop instructional materials for delivery using technology, lack of administrative support and incentives, and lack of skill and expertise to develop materials. Li and Lindner (2007) reported that teaching experiences and distance education experiences posititvely impacted the adoption of distance education practicies and thus increasing these experiences could in fact encourage adoption. An additional study (Mowen, Wingenbach, Roberts, & Harlin, 2007), which focused on teaching biotechnology, found that agricultural science teachers do not prefer to create their own instructional materials – but instead prefer material to be off–the–shelf.

Understanding barriers to using technologies, as illustrated by Nelson and Thompson (2005), is important because teachers often teach as they are taught. Thus, if preservice teachers are not exposed to a variety of technologies in preservice programs – it is possible that they will not select to use new technologies such as the iPod in their classrooms. In fact, a study by Kotrlik, Redmann, and Douglas (2003) revealed that "teachers perceptions of barriers to the integration of technology, … [is] a strong predictor of the extent to which agriscience teachers integrate technology in the teaching/learning process" (p. 78). In addition, the incorporation of technology into actual lessons and course delivery by teachers requires planning. As reported by Ball, Knoblock, and Hoop (2007) this planning is influenced by the knowledge and experience of the teacher in addition to other factors.

While "how–to" articles are abundant in regard to using technology, specifically the use of portable media devices, instructors often do not have time to research and learn how to use these new technologies. Concerns such as "differences between players" and "monitoring what students are playing on the devices" are just two concerns that are often mentioned by educators (Villano, 2006) in regard to devices such as the iPod. Kotrlik et al. (2003) found that while agricultural science teachers were active in exploring and adopting technology for teaching, they were not very active in later phases such as experimentation and advanced integration of

technology. The authors further stated that integration of technology into the educational process is necessary in order to provide quality education.

The educational effectiveness of using technology has often been studied by comparing web–based and traditional methods. Koch, Townsend, & Dooley (2005) looked specifically at "leadership" education and found no significant difference in academic acheivement between students taught in a traditional format and those taught using web–based methods. In fact, so many studies have focused on the topic of comparing courses based on delivery mechanisms (traditional vs. non–traditional settings) that a synthesis of research was conducted and published stating a "no significant difference phenomemnum" (Russell, 1999). Meaning that across multiple settings and content there is no significant difference in learner outcomes based on mode of delivery. As stated by Williams (2006), "Priciples of sound pedogogy are the same in face–to–face and distance classes" (p. 14).

Encouraging the adoption and use of technologies such as the iPod and related devices requires an understanding of teacher use of these technologies. The theoretical base for this study rests upon Rogers' diffusion of innovation research. Rogers (2003) described five stages that one goes through in the innovation–decision process: knowledge, persuasion, decision, implementation, and confirmation. Understanding where an individual is within the innovation–decision process can be helpful when developing strategies to encourage or discourage adoption. In fact, there are multiple concepts that should be taken into account at each of the stages. Thus, depending on what stage a teacher is at can determine the best strategy to use. Understanding the attitudes and beliefs of agricultural science and technology teachers is critical in understanding how technologies such as the iPod are being adopted.

While Rogers (2003) unmistakably indicated that the research is not clear as to whether needs precedes awareness of an idea or innovation or if awareness actually creates a need, based on the model of diffusion presented by Rogers – it is plain that understanding both the needs of teachers and recognizing their level of knowledge and use of iPod and related devices can assist in understanding the extent to which these technologies may be useful in particular settings.

It is important to recognize that types of knowledge fall into three primary areas: What is the innovation?; How does the innovation work?; and Why does the innovation work?. Rogers (2003) explained that individuals who have an awareness of an innovation may then be motivated to gain additional information that exposes how the innovation works and why. This study seeks to gain an understanding of the level of knowledge held by agricultural science teachers about iPod and related devices, their access to the technology, and also their attitude toward the technology.

It is recognized that all individuals do not adopt innovations in the same manner or at the same rate. Rogers (2003) classified individuals into "adopter categories" based on individual innovativeness. These categories included: innovators, early adopters, early majority, late majority, and laggards. While one must be aware that there are exceptions to these categories, it is helpful to think about individuals in categories to facilitate understanding of the adoption process for a given set of individuals. Rogers described each of the categories as follows. *Innovators* are "venturesome" and are the first to "try out" a new innovation because they are not

afraid to have setbacks. *Early adopters* are associated with the word "respect" because they have a high degree of opinion leadership within communities and are looked to as role models. The *early majority* are considered "deliberate" because while they have a strong willingness to adopt, they do not often lead the adoption process. This group considers a new innovation for quite some time prior to adopting it. The *late majority* are labeled as "skeptical" because they are cautious in adopting something new and look to others to verify that the uncertainty of a new innovation is gone before they are willing to adopt. Finally, the *laggards* are labeled as "traditional" because they are often suspicious of new innovations and must be certain regarding the success of a new innovation. Each of these groups possesses unique characteristics in regard to "socioeconomic status, personality values and communication behavior" (p. 287). Understanding where agricultural science and technology teachers fit within these categories in regard to iPod and related devices can assist in understanding the adoption process.

Additionally, it is important to understand how agricultural science and technology teachers perceive the innovation itself. Rogers (2003) listed five attributes of innovations of which one needs to be aware: "relative advantage, compatibility, complexity, trialability, and obervability" (p. 221). Each of these attributes can impact adoption. Scheduling problems and students occupied by other programs, classes, and interests have been identified as two particular recruitment issues of high school agricultural education programs (Myers, Breja, & Dyer, 2004). It is possible that the use of new technologies such as the iPod could address these issues through increased flexibilty of content delivery. Multiple studies (Miller & Honeyman, 1993; Miller & Miller, 2005; Moore & Wilson, 2005), over the past several years have indicated the importance of asynchronous methods such as video tapes to students due to the convinence that this means of delivery provides. In some ways, technologies such as the iPod are merely changing the way in which the media can now be provided. Instead of "mailing" a video tape to a student, a teacher is able to "post" a video or audio clip on the Internet for the students to download and view.

In addition, the portability and playback controls using an iPod vs. a traditional videotape player provide increased flexibility. Material delivered on iPod devices can be similar to materials previosly described by Roberts and Dyer (2005a) in relation to content delivered for online learning. The difference lies in the portability of the content. A previous description of asychronous content was described as "mimic[ing] the traditional lecture" (Roberts & Dyer, 2005a, p. 3). iPod and similar devices allow that lecture to be transported to a location of a student's choosing using a device of which they are familiar. However, it is not known if teachers perceive this characteristic of "flexibilty" as a beneficial attribute to the innovation of the iPod adding to relative advantage and compatibility. Understanding how teachers perceive these characteristics can assist one in impacting the rate of adoption. As shared by Rogers (2003), "change agents and diffusion scholars must understand how potential adopters perceive new ideas" (p.266).

Use of eLearning technologies across educational settings continues to increase. With the development of increasingly smaller mobile devices, such as the iPhone by Apple, there are increasing opportunities. As shared by Merrett (2006), the iPod was released in October 2001. Since that time, multiple formats and editions have been released. In fact, it has been reported by Ross (2007) that over 70 million iPods have been sold since Apple introduced the device in 2002. However, as shared by Panettieri (2007), social networking and streaming music/video are

what students were most interested in. One example of the breadth of adoption is that Panettieri reported that "more than half of Harvard Medical School students carry personal digital assistants (PDAs) such as iPods, Palm handheld PCs, and smart phone devices …" (p. 40). However, it is not known to what extent certain technologies are being adopted across agricultural science in high school settings. Awareness of agricultural science and technology teachers' knowledge, access, and attitude toward iPod, mp3, and related technologies can assist those that are preparing materials for use in educational settings and providing service training for preservice teachers and others. iPod technologies refers to portable digital audio/video players designed and marketed by Apple Computer. There are multiple kinds of iPods (i.e., iPod mini, iPod shuffle, iPod mp3 Player, etc.) There are also competing mp3 players such as the Zune mp3 player from Microsoft, the Sony mp3 player, SanDisk Sansa mp3 player, and the iRiver mp3 player. These devices allow one to take audio and/or video downloaded from the Internet (or on the computer) and play these files at their convenience – when and where they want to play them. It is believed by many that portable digital audio/video players (iPod) have tremendous potential for education. However, it is not known to what degree they have been adopted or exactly how they are being used. To what extent are agricultural science and technology teachers posed to utilize this technology? If materials were made available for use/delivery on devices such as the iPod – would the teachers use them? This study seeks to assist in answering these questions.

Purpose & Objectives

The purpose of this study was to establish baseline data for adoption of iPod and mp3 technologies by agricultural science and technology teachers. Three objectives guided this inquiry.

1. Describe agricultural science and technology teachers' knowledge of iPod and mp3 technologies.
2. Describe agricultural science and technology teachers' access to iPod, mp3, and related technologies.
3. Describe agricultural science and technology teachers' attitudes towards iPod and mp3 technologies.

Methodology

The objectives of this study were met using a mailed questionnaire. The population of interest was all agricultural science and technology teachers in Texas (N = 1605) determined by the *Directory of Texas Agricultural Science and Technology Teachers*. A census of the population was deemed impractical and unnecessary, so a sample of 310 was randomly drawn from the population (Krejcie & Morgan, 1970).

A 35–item questionnaire was developed from a review of the literature and consisted of four sections: knowledge, access to technologies, attitudes, and demographic information. Items related to teachers' knowledge and access to technologies were accompanied by a finite set of options (2 to 4), depending on the question. Items related to teachers' attitudes were accompanied by a five–point summated rating scale. Content and face validity of the instrument

was determined by a panel of university faculty with requisite expertise, but not involved in the current study (Gall, Gall, & Borg, 2003). Reliability of the instrument was determined by a test – retest procedure using a pilot test with 26 preservice teachers at Texas A&M University. This procedure yielded a coefficient of stability of .89. Although preservice teachers are somewhat different in age and experience than current teachers, this group was deemed appropriate for reliability analysis. As noted earlier, validity was established by a separate process.

Questionnaires were delivered using the *Tailored Design Method* (Dillman, 2000). Teachers in the sample were sent a *prenotice letter*, followed a few days later with the *questionnaire* and *cover letter*. Approximately ten days later, a *thank you postcard* was sent. Two week later, a *replacement questionnaire* and second cover letter was sent to teachers that had not responded. This set of questionnaires was printed on a different color paper to allow for easy differentiation from the first mailing. Following these procedures, 130 responses were received (41%). Because of the low response rate, double–dipping non–response procedures were implemented (Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). A random sample of 10 percent (n = 19) of the non–respondents were contacted by telephone and provided responses to the items on the questionnaire. No differences were found between respondents and non–respondents, thus, the data collected by telephone was pooled with the previous data collected, yielding a total of 149 responses (48%). Given that the double-dipped sample was not different from the original respondents, the data collected was deemed representative of the population and generalized to the broader population (Lindner et al., 2001; Miller & Smith, 1983).

Results & Findings

The average teacher was a male (81.1%), just over 38 years old (SD = 10.40), and had been teaching for 13 years (SD = 9.93) (Table 1). Beyond classroom instruction, the vast majority of teachers prepared Leadership Development Event (LDE) teams (94.5%), Career Development Event (CDE) teams (94.5%), traveled with students to local stock shows (96.6%), and traveled with students to major stock shows (90.4%). When asked to rate their proficiency with computer–related technologies, the majority of teachers (69.2%) rated their skill level as intermediate. Only 2.1 percent classified themselves as non–users.

Table 1
Description of Agricultural Science and Technology Teachers

	M	*SD*
Age (*n* = 145)	38.69	10.40
Years Teaching (*n* = 146)	13.71	9.93
Gender (*n* = 143)	*f*	Percent
Male	116	81.1
Female	27	18.9
FFA and SAE Activities	*f*	Percent
Preparing Leadership Development Event (LDE) Teams (*n* = 146)	138	94.5
Preparing Career Development Event (CDE) Teams (*n* = 146)	138	94.5
Traveling With Students to Local Stock Shows (*n* = 146)	141	96.6
Traveling With Students to Major Stock Shows (*n* = 146)	132	90.4
Proficiency With Computer Technologies (*n* = 146)	*f*	Percent
Non–User	3	2.1
Novice	20	13.4
Intermediate	101	69.2
Advanced	22	15.1

Objective One: Describe agricultural science and technology teachers' knowledge of iPod and mp3 technologies.

Nearly all the teachers (97.9%) were aware of iPods or mp3 players and over half (53.1%) were aware of podcasts (Table 2). However, less than one–fifth (19.9%) actually owned an iPod or mp3 player and 16 percent indicated they had access to these devices at school. The majority of teachers (60.0%) had the ability to use media management software, such as iTunes© or Windows Media Player©. A much smaller portion had the ability to create audio clips (26.9%) and video clips (24.1%).

Table 2
Agricultural Science and Technology Teachers' Knowledge of iPod or mp3 Technologies

	n	*f*	Percent
Aware of iPods or mp3 Players	145	142	97.9
Aware of Podcasts	143	76	53.1
Owns an iPod or mp3 Player	146	29	19.9
Access to an iPod or mp3 Player at School	145	24	16.6
Ability to Use Media Management Software (iTunes, etc.)	145	87	60.0
Ability to Create Audio Clips	145	39	26.9
Ability to Create Video Clips	145	35	24.1

The majority of teachers *never* used iPods or mp3 players to listen to audio clips, including songs (54.5%), or watch video clips (55.9%) (Table 3). Very few teachers used iPods or mp3 players

daily to listen to audio clips (8.3%) or watch video clips (2.8%). On a *weekly* basis, only a few teachers listen to audio clips (18.6%) or watch video clips (15.9%). While on a *monthly* basis only a few teachers listen to audio clips (18.6%) but over a quarter watch video clips (25.5%).

Table 3
Agricultural Science and Technology Teachers' Frequency of Use of iPods or mp3 Technologies (n = 145)

How often do you download or listen to:	Audio Clips (including songs)		Video Clips	
	f	Percent	*f*	Percent
Daily	12	8.3	4	2.8
Weekly	27	18.6	23	15.9
Monthly	27	18.6	37	25.5
Never	79	54.5	81	55.9

Objective Two: Describe agricultural science and technology teachers' access to iPod, mp3, and related technologies.

Agricultural science and technology teachers overwhelmingly had access to a computer lab (93.8%) and access to the Internet in their classroom (95.1%) (Table 4). However, just over a third (36.1%) had wireless access to the Internet in their classroom. The majority of teachers did have computers in their classroom for student use (65.3%). Very few schools issued laptops to students (13.2%), issued personal digital assistants (PDA) to students (0.7%), or issued iPods or mp3 players to students (0.7%). Only 5 percent of schools used podcasts.

Table 4
Agricultural Science and Technology Teachers' Access to Technologies at School

	n	*f*	Percent
Internet Access in Classroom	144	137	95.1
Wireless Internet Access in Classroom	144	52	36.1
Computers for Student Use in Classroom	144	94	65.3
Access to Computer Lab	144	135	93.8
School Uses Podcasts	141	7	5.0
School Issues Laptops to Students	144	19	13.2
School Issues Personal Digital Assistants (PDAs) to Students	144	1	0.7
School Issues iPods or mp3 Players to Students	143	1	0.7

To *watch or listen* to audio or video clips, nearly the same portion of teachers had access at home (61.1%) and at school (63.9%) (Table 5). However, much fewer of the teachers had access to create audio or video clips at home (41.7% and 34.7%, respectively) than at school (59.7% and 59.0%, respectively).

Table 5
Agricultural Science and Technology Teachers' Access to iPod Technologies

	Home		School	
Where do you have access to:	*f*	Percent	*f*	Percent
Watch/Listen to Audio/Video Clips (*n* = 144)	88	61.1	92	63.9
Create *Audio* Clips (*n* = 144)	60	41.7	86	59.7
Create *Video* Clips (*n* = 143)	50	34.7	85	59.0

Teachers were also asked to survey their students to see how many owned iPods or mp3 players. Note that only two–thirds (67.1%) of the teachers provided this data, so inferences are questionable (Table 6). The majority of teachers (58%) indicated that at least half their students owned an iPod or mp3 player. The greatest percentage (68%) said that between 25 and 75 percent of their students owned one of the devices. No teachers indicated that none of their students owned an iPod or mp3 player.

Table 6
Agricultural Science and Technology Students' Owning iPods or mp3 Players

How many students in your classes own iPods or mp3 Players?	*F*	Percent
100%	3	3.0
75.0% to 99.9%	18	18.0
50.0% to 74.9%	37	37.0
25.0% to 49.9%	31	31.0
0.1% to 24.9%	11	11.0

Note. Teachers were asked to indicate the enrollment in each class and the number of students that had iPods or mp3 player. Response rate was 67.1% (100 of the 149 teachers).

Objective Three: Describe agricultural science and technology teachers' attitudes towards iPod and mp3 technologies.

Teachers expressed moderate interest in curricula materials and in–service training for iPods and mp3 players (Table 7). Teachers were most interested in "Modifiable Curricula and FFA Materials" (*M* = 3.45, *SD* = 1.18), but slightly less interested in "Pre–produced Curricula and FFA Materials" (*M* = 3.36, *SD* = 1.17). Teachers were also moderately interested in "In–service Training on Creating Audio and Video Clips" (*M* = 3.39, *SD* = 1.27).

Table 7
Agricultural Science and Technology Teachers' Interest in Materials and Training (n = 143)

	M	*SD*
Pre–produced Curricula and FFA Materials for iPods or mp3 Players	3.36	1.17
Modifiable Curricula and FFA Materials for iPods or mp3 Players	3.45	1.18
In–service Training on Creating Audio and Video Clips	3.39	1.27

Note. Scale range from 1 = "Not Interested" to 5 = "Very Interested"

Teachers did express that iPod and mp3 technologies had uses in agricultural science education (Table 8). Teachers expressed the greatest use would be for "Training Materials for FFA

Competitions" (*M* = 4.02, *SD* = 1.14). Teachers also expressed that these devices could be used for "Videos Shown during Class Time" (*M* = 3.69, *SD* = 1.13) and "Pre–produced Video Lessons for Absent Students" (*M* = 3.70, *SD* = 1.19). Teachers perceived these devices to also be useful, although not to the same extent as the uses above, for "Self–produced *Audio* Recordings of Class for Absent Students" (*M* = 3.15, *SD* = 1.30) and "Self–produced *Video* Recordings of Class for Absent Students" (*M* = 3.12, *SD* = 1.26).

Table 8
Agricultural Science and Technology Teachers' Perceptions of Usefulness of iPods or mp3 Players

	N	*M*	*SD*
Videos Shown During Class Time	143	3.69	1.13
Pre–produced Video Lessons for Absent Students	143	3.70	1.19
Training Materials for FFA Competitions	144	4.02	1.14
Self–produced *Audio* Recordings of Class for Absent Students	142	3.15	1.30
Self–produced *Video* Recordings of Class for Absent Students	143	3.12	1.26

Note. Scale range from 1 = "Note Useful" to 5 = "Very Useful"

Conclusions & Implications

Based on the findings of this study, it was concluded that agricultural science and technology teachers across Texas are comfortable with computer technologies and the majority perceive themselves to have intermediate to advanced proficiency in using computer technologies. It was also concluded that teachers are strongly aware of iPods, mp3 players, related technologies and the software used with said technologies. Teachers can be described as having completed the "knowledge stage" of the innovation–decision process as described by Rogers (2003). They are aware of the innovation and maintain an understanding of how the innovation functions.

However, based on the low percentages (26% for audio and 24% for video) of teachers reporting the ability to create audio and video clips, it was concluded that the majority of agricultural science and technology teachers do not possess the abilities required to create media for portable media devices.

It was interesting that more than half of the respondents indicated that they "never" download or listen to audio or video clips. It was concluded that while teachers are "aware" of these computer technologies, they are not actively using them on a regular basis. It is possible that this "lack of use" could be a result of "lack of support" as shared in the Roberts and Dyer (2005b) study regarding support to create and deliver courses utilizing specific technologies.

Based on findings related to teacher access to technologies at school, it was concluded that agricultural science and technology teachers across Texas have access to the Internet in the classroom and computer labs. Many even have computers for student use in the classroom. However, it was further concluded that the majority of schools across Texas do not issue technologies such as laptops, personal digital assistants, or mp3 players on a broad scale. While teachers could expect students to have access to iPod compatible materials viewed on a

computer, they could not expect all students to have access to portable devices such as the iPod and related technologies.

It was interesting to find that teachers reported the ability to listen/watch to audio/video as equally possible at school as at home. It was concluded that teachers who have knowledge and ability in regard to technology use seek access in different settings once they understand how it works.

Given that less than half of the respondents reported knowing how to create audio/video, it was concluded that the complexity of use at this level is high for the teachers in regard to the creation of content. In addition, respondents reported a greater ability to create audio/video clips at school than at home which leads one to conclude that teachers felt their home computer hardware and/or software were not sufficient to complete these tasks.

Findings reveal that teachers are by far less likely to own and utilize an iPod than are their students. Of the teachers that responded regarding student iPod ownership, over half of these teachers reported that at least 75% of their students owned iPods. It was concluded that wide adoption of the iPod and related technologies has taken place among the high school population. Students of agricultural science and technology teachers, according to Rogers (2003) adopter categories, are the "innovators" and "early adopters" of iPods and related technologies, while the teachers themselves fall into the later adopter categories (i.e., "late majority", "laggards") of said technologies. Only five percent of the teachers reported that their schools used podcasts; thus, it was concluded that the majority of schools are not actively engaged in the creation of media for delivery on iPod or related devices.

Based on findings in this study, it was concluded that teachers have a favorable attitude toward iPods and related technologies. Given that teachers were moderately interested in materials and training that could be delivered on iPod or related technologies, it was also concluded that there is a demand for such materials. The highest demand appeared to be for modifiable curricula and FFA materials. It should also be noted that the interest expressed for in–service training on creating audio and video clips reveals an opportunity. It was concluded that if training were offered, there might be a large percentage of agricultural science and technology teachers that would attend. Two attributes of the innovation could be enhanced through these training opportunities: trialability & observability. Providing opportunities for teachers who are familiar with the technology to demonstrate use of the technology to other teachers could further enhance their favorable attitude. In fact, the finding that teachers held a favorable attitude indicates that they have reached the "persuasion" stage of the innovation–decision process as described by Rogers (2003).

Findings related to agricultural science and technology teachers' perceptions of usefulness of iPods and related technologies reveal that teachers do find the devices to have a place in the academic environment. Teachers expressed that these devices could be useful in providing videos during class time, serving the needs of absent students, and providing training materials for FFA competitions. Thus, it was concluded that agricultural science and technology teachers do perceive iPod and related technologies to be useful and also perceive "flexibilty" as a beneficial attribute of the iPod.

In fact, it can further be concluded that teachers believe that one of the best uses for these devices is FFA training materials for competitions and Career Development Event preparation. This finding is similar to that found in the study (Mowen et al., 2007) focused on teaching biotechnology that found that agricultural science teachers do not prefer to create their own instructional materials – but instead prefer material to be off–the–shelf. While teachers expressed interest and support for media that could be used on these devices, it is unclear if any of the teachers have actually engaged in a decision to either adopt or reject the use of such media. It was concluded that teachers had not reached the "decision stage" in the innovation–decision process as decribed by Rogers (2003).

Recommendations

Several recommendations can be made utilizing the data collected. With only about a quarter of teachers surveyed having the ability to create audio and video clips on computers, it is possible that the technology utilized to create podcasts for iPods is too complex to learn on ones own. It is therefore recommended that workshops and professional development opportunities related to the use of iPods, podcasts and mp3 players be provided for teachers. Participation may assist teachers move beyond the persuasion stage of the innovation–decision process to the decision and/or implementation stage .

Considering that teachers felt that iPods and podcasts would be most useful for delivering training materials for FFA competitions and Career Development Event (CDE) preparation, it is recommended that the National FFA Organization consider converting recordings of CDE finals to podcast or mp3 format and make them available to FFA chapters. A follow up study could be conducted to see if availability in this format was found to be beneficial to the students or teachers and if not, what alterations could be made to make them more beneficial.

In addition, it should be noted that following up with non–respondents became increasingly challenging following the end of the academic school year. Similar studies should ensure that data collection take place with sufficient time allowed for non–respondent contact prior to the close of the school year.

Further, similar studies could be conducted in other states to determine if these findings hold true for other populations. This study should also be replicated periodically to determine how the adoption rate has changed.

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High School Principal's Current Perceptions Regarding Supervised Agricultural Experience

A Critique

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Research into the area of Supervised Agricultural Experience (SAE) programs reached its peak in the 1980s, but has since been sporadic at best. The authors note that a "rich history" of SAEs is ingrained in traditional Agricultural Education programs and is acknowledged as the first formal experiential learning model in Career and Technical Education. They also rightfully acknowledge that research over the past half century indicates that SAEs are a declining component of the total agricultural education program. Whereas teachers publicly decry the value of SAEs, they often fail to transfer their public beliefs into action by either requiring every student to complete an SAE or by providing students with those opportunities.

It is difficult to imagine that anyone would argue with the premise that teaching is more difficult today than when SAE programs were first proposed as a teaching tool. Given today's time demands upon agriculture teachers, and the shift in the agricultural community from a production to consumption orientation, opportunities for meaningful SAE programs are arguably more difficult to utilize. On the other hand, so many more opportunities exist for students to experience non-production agriculture, student interest level should be improved.

Key to student involvement in SAE programs is the support of teachers, parents, administrators, and the community. Has that support dwindled over the past two decades? After over 20 years of very limited research into the usefulness of SAEs, this study begins a process of re-evaluating the value of those programs. Specifically, the study examines high school principals' perceptions and knowledge of Supervised Agricultural Experience programs using a population of North Carolina principals in schools with an agriculture program.

The authors do a very good job of delineating conceptual and theoretical frameworks that focus their study. Appropriate objectives are presented and the results of the study are aligned with their stated objective. However, since this is a population study and the researchers use a mean scale to group perceptions, the use of *t*-tests is not necessary. Also, I would caution the authors to avoid statements that might be viewed as biased, such as "It is encouraging…principals consider [SAE] programs to be important" or "Another promising conclusion…principals who serve in urban settings…have an appreciation for [SAE]…". Given the change in the types of students enrolled in agriculture programs today and the lack of current research that validates the effectiveness of SAEs, it actually may be *discouraging* that principals consider SAE programs to be important – if SAE programs no longer prove to be effective.

The researchers are to be commended for undertaking a study that begins to update the research base in the area of SAEs. Additional studies would be most helpful, and I would encourage these researchers to continue in this focus area.

Defining Utilization of the Texas Agricultural Science Record Keeping System According to Stakeholder Insight: A Delphi Study

A Critique

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The use of Supervised Agricultural Experience (SAE) programs in agricultural education has a storied and sometimes contentious past. Originally conceived as a means to personalize agricultural experiences for students (and to eliminate the duplication of on-farm and at-school experiences), the practice of incorporating SAEs into an agriculture program for students is deeply rooted in the concept of experiential learning. However, as agricultural education has moved from a production agriculture focus to one of consumption agriculture, the opportunities afforded students have often not kept pace with the change in focus. As a result, anecdotal evidence indicates that the perceived value of SAEs seems to be more closely associated with record-keeping and providing a source of information for FFA award applications than as an experiential learning teaching method. This study explores this phenomenon in the context of the agricultural science programs in Texas.

The purpose of this study was to identify the purposes and outcomes of the Texas agricultural science record keeping system. The researchers used the Delphi technique to form consensus opinions from an expert panel consisting of the Texas FFA Association and Texas Education Agency staff, area coordinators, FFA supervisors, expert teachers, and university faculty in agricultural education.

The authors followed accepted procedure in their use of the Delphi technique. They also did a good job of laying a conceptual groundwork for the study in their explanation of the record-keeping system in Texas. However, additional information concerning previous research on this or related areas would have been helpful.

This well-written study identifies the perceived use of record-keeping in an agricultural science program as being closely associated with recording student involvement in SAE and FFA activities, and documenting student accomplishments for award applications. Only one of the 11 perceived purposes focused on teaching about financial management. Likewise, of the 14 perceived outcomes of using the record-keeping system, less than half dealt directly with student learning. Is the purpose of teaching record-keeping to serve as a means to document students' involvement in SAE and FFA activities, or should it be to teach students how to manage their finances? It seems credulous that students can complete a unit of instruction in record-keeping and be unable to balance their check books, complete an inventory, or select the best cell phone plan based upon their usage pattern and the per minute cost of the various plans. What should the outcomes be, and how does the profession accomplish this change? Again, the authors of this paper have done an excellent job of planning and executing a research project that addresses an important area of concern for the profession.

Examining iPod Use by Texas Agricultural Science and Technology Teachers

A Critique

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The purpose of this very well done research project was to explore the knowledge of, access to, and attitudes toward iPod and mp3 technologies among agriculture teachers in Texas. As the authors point out, teachers often tend to teach using only those tools with which they are knowledgeable and comfortable. As new technologies emerge, teachers are often tardy in accepting and implementing the change for a myriad of reasons: lack of access to technology, time limitations, perceived need, etc. For whatever reasons, however, it is important for agriculture teachers to change with their environment, and nowhere does that environment change faster than in education. A result of the technological explosion is that students, even in the earliest grades, are often more knowledgeable than adults in the acceptance and use of new technology.

The authors have done an excellent of presenting conceptual and theoretical frameworks that serve as a foundation for research in this area. Likewise, the objectives that guide this study are clearly articulated and the methods by which the project was conducted are appropriate and clearly tied to the corresponding objective.

Interestingly, although most teachers possessed intermediate to advanced proficiency in computer use, a majority had never downloaded audio or video clips, did not possess the necessary skills required to prepare media for portable media devices, and were not likely to use the devices in courses. Has advanced proficiency in the use of computers become merely the threshold for technology use?

Although not an objective of the study, it would be interesting to determine how the variables of teacher age, experience, and professional activities related to their use of technology. Likewise, a qualitative component would add to understanding why teachers fail to adopt technology readily. A related study that explores the differences in adoption readiness between teachers and their students may help to explain why teachers seem to be at an entry level and students are impatiently awaiting the next generation of Wii.

Although it was recommended to offer workshops and inservice programs to assist teachers in using iPods, podcasts, and mp3 players, teachers expressed only a moderate interest in attending. Are there recommendations for motivating teachers to attend these types of professional development activities? What are the concerns of teachers in adopting new technology? Do they simply feel that, given the rapid rate of technological developments, they are wasting their time in trying to keep up with the latest “fad” to hit the market?

Again, the authors of this paper have done an excellent job of planning and executing a research project that addresses such an important topic as the adoption of innovations among teachers.

PROBLEMS AND INQUIRY-BASED LEARNING: A THEORETICAL AND PRACTICAL SYNTHESIS

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Abstract

All people problem solve and problem solving is the key to life (Kirton, 2003). Most agricultural education professionals over the years would agree, but according to Structured Problem Solving Theory (Sickafus, 2006), the linearity and structure of problem-solving must be accompanied by less structured natural thinking. A synthesis of related research and resources related to problem-solving was conducted and two methods surfaced as prominent, but complimentary tools for possible use in agricultural education. Problems-based learning (PBL) and Inquiry-Based Learning (IBL) are popular teaching approaches that originated in medical schools. Although distinctions between the approaches exist, the terms have been used interchangeably within pedagogy and instructional design textbooks. Both employ student initiative as a primary force and support student-instructor interaction while placing on the student primary responsibility for the learning process (Donner & Bickley, 1993). The popularity of the methods stems from the reported successes as an instructional strategy. Both can be used to enhance student mastery of content, communication, and problem-solving. According to Burris, (2005) PBL also promotes student-centered learning (Maxwell, Bellisimo, & Mergendoller, 2001), improves student motivation and teamwork (Vernon, 1995), and even improves critical thinking abilities (Hmelo, 1998; Ball & Knobloch, 2004). Burris also noted that PBL emphasizes student understanding and learning how to learn. Likewise, IBL as an instructional method forces students to develop solutions to life-like problems, contextualizing student knowledge acquisition (Jacobsen, Eggan & Kauchak, 2002). IBL promotes what Applebee (1996) referred to as "knowledge-in-action" rather than "knowledge-out of-context" (p.30). With such support for PBL and IBL as instructional strategies, the anatomy of each approach was investigated and reported in the paragraphs that follow.

Introduction and Theoretical Framework

All people problem solve and problem solving is the key to life (Kirton, 2003). Such a bold generalization by British theorist, Michael Kirton, would seemingly be applauded by years of agricultural education pedagogical practice dedicated to the problem-solving approach. As Flowers (1987) explained, this approach has been recommended over the years as the primary teaching approach by an assortment of well-respected authors. In agricultural education, the problem-solving approach to teaching usually involves an interest approach, a description of teaching objectives, identification of the problems to be solved, actual problem solution, testing of the solution, and an evaluation of the solution (Newcomb, McCracken, Warmbrod, & Whittington, 2004). While this method is familiar to many agricultural education professionals and sensible to colleagues in colleges of agriculture, its title and methodology is not ingrained in mainstream educational research and practice. Flowers found that the problem solving approach was no more or less effective in improving student achievement. However, regarding student achievement, Shinn, Briers, Christiansen, Edwards, Harlin, Lawver, Lindner, Murphy,

and Parr (2003) proffered that "students become more engaged using inquiry-based, problem-solving learning strategies, particularly when coupled with highly qualified, caring teachers who deploy a contextualized curriculum that connects new ideas and skills to students' past knowledge and experience"(p.23). Perhaps agricultural education should look to more contemporary and more effective approaches to teaching with and for problem-solving. Accordingly, Shinn et al. describe a promising approach that expands on the premise of exposing students to the how (procedural knowledge) and why (conceptual knowledge) of a problem and including the where (contextual knowledge) in an effort to make real world connections in a contextually based approach to inquiry based instruction.

Specifically, the theoretical foundation for this study is the Structured Problem Solving Theory (Sickafus, 2006), which states that structured problem-solving methods are structured and organized while our natural thinking is not. This theory also espouses that although neither organized or logical, natural thinking often has resources that are overlooked.

Purpose and Objectives

Given the linear nature of agricultural education's problem-solving approach to teaching, the purpose of this pedagogical primer is to investigate the literature and report on two methods of teaching and learning related to the problem-solving approach that allow for the inclusion and practice of natural thinking in teaching and learning. Specifically, the objectives were to describe Problems-based learning and Inquiry-based learning, describe the theoretical underpinnings of each, and convey some teaching tips when using the methods.

Procedures

Several sources from a variety of disciplines were consulted to conduct the content analysis providing for this primer. Library resources and internet searches were performed by four researchers from four different universities across the country and appropriate compilation and synthesis of the most important scholarly publications ensued. Works included studies and application briefs related to all forms of teaching and learning process related to problem-solving, problems-based learning, and inquiry-based learning.

Findings

What is Problems-based Learning?

Problems-based learning (PBL), sometimes referred to as case-based learning, is an instructional tool that has been effectively used in medical training for decades (Hmelo, 1998). PBL expects students to collectively experience contextualized, relevant, ill-structured problems and to strive to find and create meaningful solutions. This method needs to be facilitated by instructors, but learning is primarily constructed by students who have been presented with the problem. Thus, the defining characteristics of problems-based learning include:

(a) Learning is driven by challenging open-ended problems;
(b) Students work in small collaborative groups; and

(c) Teachers take on the role of facilitators of learning.

As a pedagogical process, PBL requires students to learn in groups. Social interaction provides learners with opportunities to test and defend their own understanding as well as enrich and expand their knowledge by examining the views of others (Richardson, 2003, as cited in Burris 2005). Eggen and Kauchak (2001) even cite sociocultural learning theory, a cognitive view of learning emphasizing student participation in meaningful learning activities, as one of two theoretical foundations of problems-based learning. Faculty members may facilitate problems-based learning by making their classrooms/labs communities of learning.

PBL involves a certain sequence of events. The method requires an encounter with the problem or case and a seeking of information and solutions prior to content area instruction. A specific order of events was outlined by Stepien, Gallagher, and Workman (1993):

> Problem-based learning is apprenticeship for real-life problem solving…students find a situation with undefined problems, incomplete information, and unasked questions. The scenarios presented to the students demand problem solving the way we find it in life: defining and detailing issues, creating hypotheses, searching for and then scanning data, refining hypotheses with the help of the collected data, conducting empirical experiments or other research, developing solutions that fit the conditions of the problem and evaluating and/or justifying their solutions so there is reason to expect conditions will improve (p. 342).

Burris (2005) added that the problem/case in PBL should be messy and ill-structured. This messy and perplexing cognitive conflict is the incentive for learning and determines the form and function of what is learned (Ball & Knobloch, 2004; Savery & Duffy, 2001). A good problem or case for analysis is not just messy and ill-structured. Tchudi and Lafer (as cited in Ward & Lee, 2002) noted good problems have the following characteristics:

> They (a) confuse just enough to provoke curiosity and provide a reason for learning, (b) provoke thought on new things in new ways, (c) help students discover what they do and do not know, (d) ensure that students reach beyond what they know, (e) create a need and desire for skill and knowledge, (f) lead to understanding the relationship of a procedure to the problem which makes the procedure sensible, (g) naturally lead to interdisciplinary inquiry, (h) build strong communities of learners; and (i) lead to cooperation in the strongest sense that is based on the will and desire to succeed rather than a set of dictated behaviors that are advocated for the sake of politeness. Tchudi and Lafer also note that a quality problem should have a visible product or presentation that is viewed by an outside audience. Most of the production of this product or presentation should be completed during class time and be a class-wide effort or a class collection of smaller projects. This further encourages the development of collaboration and teamwork skills (p. 18).

Contextualized learning is a fundamental factor associated with problems-based learning. PBL is a form of education in which knowledge is mastered through the same context in which it will be used (Donner & Bickley, 1993). The contextualized nature of PBL does not refer to subject-specific or compartmentalized problems. Putnam (2001) noted that PBL is often interdisciplinary and he posited that knowledge and skills needed to solve real world problems are not acquired in a compartmentalized fashion. Instead the instructor-prepared problems should reflect real-life practice (Lohman & Finkelstein, 2000) and thus require an array of resources (people, facts, figures, situations, etc…).

What is Inquiry Learning?

Most pedagogical specialists make a distinction between Problems-Based Learning and Inquiry Learning, although there are numerous similarities. Joyce, Weil, and Calhoun (2000) explained inquiry as a learning process whereby questions were created or problems were developed by the students based on facts and observations examined logically. Once the learning group had developed questions, available resources were examined to answer the questions or solve the problems. Jacobsen, Eggan and Kauchak (2002) stated "Inquiry teaching begins by providing students with content-related problems that serve as the focus for class research activities. In working with a problem, students generate hypotheses or tentative solutions to the problem, gather data relevant to these hypotheses and evaluate the data to arrive at a conclusion" (p. 208). A central point to the inquiry teaching method is involving students in developing questions then utilizing problem solving strategies to discover answers to the questions. Inquiry learning causes students to develop problem solving abilities they will likely use in the future while also creating an environment in which the students must examine specific content associated with the problem, thereby increasing content knowledge.

Alan Colburn (n.d.), a science-education teacher educator and prolific writer on the use of inquiry learning, provided his own definition for inquiry-based instruction: "the creation of a classroom where students are engaged in… open-ended, student-centered, hands-on activities… the things students do include posing questions, solving problems, and creating answers or tentative generalizations" (n.p.). Colburn indicated this kind of instruction has been known by several other names, including the learning cycle, the Suchman model, structured inquiry, guided inquiry and open inquiry.

Further, according to Colburn:

> In structured inquiry activities students are given a problem to solve, a method for solving the problem, and necessary materials, but not the expected outcomes. Students are to discover a relationship and generalize from the data collected. In guided inquiry, students must also figure out a method for solving the problem given. And in open inquiry, students must also formulate the problem they will investigate. Open inquiry most closely mimics the actions of 'real' scientists (n.p.).

Colburn noted inquiry-based instruction has been most effective in developing content achievement when the content was more concrete than theoretical. He further noted that only

when students were challenged mentally did the students' cognitive abilities increase. His example centered on students who were capable of guided inquiry but were only exposed to structured inquiry. He stressed the point of the instructor ensuring both the content and the contextualized problem appropriate to the students' cognitive abilities.

Key to inquiry learning is the notion of a cycle or spiral of inquiry. Bruce and Davidson (1996) developed the inquiry cycle, but stated it should be viewed as a three dimensional spiral. Learners should think of asking, investigating, creating, discussing, and reflecting as means for gaining both knowledge and skill for a particular concept; however the learners should understand the solution to one problem or question often leads to a more complex problem. As with any formal education, the process may be undertaken within the confines and safety of a controlled learning environment, such as a classroom. Important is the transferability of the content and the process to those uncontrolled situations of the real world.

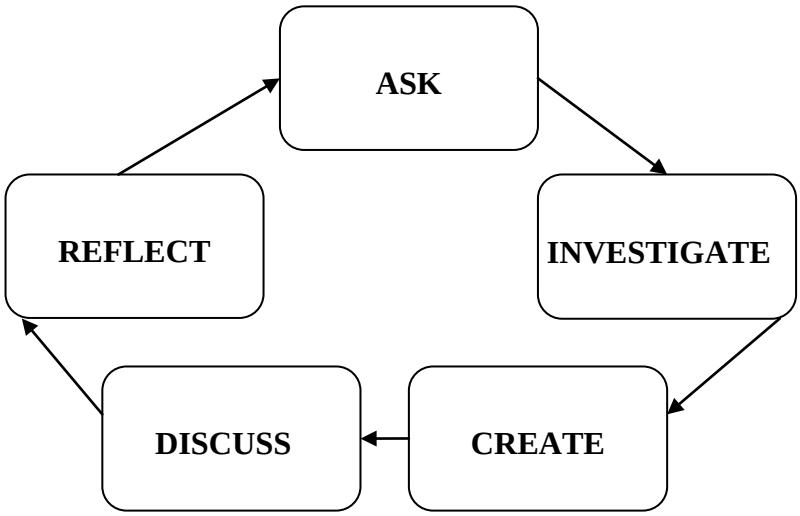

Figure 1: Bruce and Davidson's Spiral of Inquiry

Inquiry-based learning (IBL) has been used extensively in nursing education. According to Magnussen, Ishida and Itano (2000), 50% of the clinical courses in the nursing curriculum at the University of Hawaii at Manoa used IBL as a primary instructional approach. In describing how IBL was incorporated into the courses, the authors stated:

> Each tutorial group consisted of a clinical group (8 to 10 students), with the clinical faculty serving as the tutor for content expertise… The cases discussed in the tutorials generally were predesigned by faculty to cover relevant concepts. In the final two semesters, the clinical courses used the students' real clients as the cases in the tutorials.
>
> Cases were revealed to the students in a sequential manner in the first session, simulating what would occur in a real clinical situation. Students discussed what was known about the situation distinguishing relevant from irrelevant data and

> determining missing information that was needed to formulate and test hypotheses. The tutor's role at this stage was primarily to keep students on track, to encourage them to explore all relevant issues and questions, and to think critically about the cases under discussion (p 361).

In evaluating the inquiry learning, Magnussen, et al. revealed it was important for the instructor or tutor to facilitate the process but to remain in the background. The instructor's role was to ensure that all relevant learning issues were discussed sufficiently and to assist in resolving any interpersonal conflicts that arose.

Theory behind PBL and IBL

Applebee (1996) noted "discussions of curriculum in American schools and colleges have usually focused on what is most worth knowing…In such a system, students are taught about the traditions of the past, and not how to enter into and participate in those of the present and future" (p.3). Applebee continued by stressing the need for curriculum which provided what he termed "knowledge-in-action" rather than "knowledge-out-of-context" (p.30).

According to Schmidt (1993), the acquisition and structuring of knowledge in PBL was thought to work through the following cognitive effects:

- Initial analysis of the problem and activation of prior knowledge through small-group discussion;
- Elaboration on prior knowledge and active processing of new information;
- Restructuring of knowledge and active processing of new information;
- Social knowledge construction;
- Learning in context;
- Stimulation of curiosity related to presentation of a relevant problem.

These cognitive effects, inherent to problems-based learning and inquiry learning, are grounded in constructivism, which doesn't itself suggest a particular pedagogy, but rather provides an explanation of how learning ought to occur. Methods associated with constructivism are often referred to as 'learning by doing'. Without doubt, problems-based learning and inquiry learning are both learning by doing and exploring.

In addition to Dewey's (1902, 1916) beliefs that students are socially active learners who learn by experience, Doolittle and Camp's (1999) exposition of constructivist philosophy provided baseline theoretical understanding for the approach. Doolittle and Camp espoused the following tenets of constructivism:

1. Knowledge is not passively accumulated, but rather is the result of active cognizing by the individual;
2. Cognition is an adaptive process that functions to make an individual's behavior more viable given a particular environment;
3. Cognition organizes and makes sense of one's experience, and is not a process to render an accurate representation of reality; and

4. Knowing has roots both in biological/neurological construction, and in social, cultural, and language-based interactions (p. 6).

Doolittle and Camp also listed the factors of constructivist pedagogy:

- Learning should take place in authentic, real world environments;
- Learning should involve social negotiation and mediation;
- Content skills should be made relevant to the learner;
- Content skills should be understood within the framework of the learner's prior knowledge;
- Students should be assessed formatively, serving to inform future learning experiences;
- Students should be encouraged to become self-regulatory, self-mediated, and self-aware;
- Teachers serve primarily as guides and facilitators of learning, not instructors; and
- Teachers should provide for and encourage multiple perspectives and representations of content (p.18-35).

Constructivism, as an educational philosophy, represents how people solve real-life, complex problems in society by working with others to make thoughtful decisions, taking initiative and solving problems (Jonassen, 1997, as cited in Burris, 2005). Problems-based learning and inquiry learning are equally pure forms of constructivism as both require learners to work with people, information, and situations to develop solutions, thus constructing learning in the process.

Recommendations for Teaching with the Problems-Based Learning Method

When considering the use of PBL in the classroom it is important to consider the role the teacher and students will play. A common theme in the PBL literature is that students have a mixed response when encountering a PBL class format. In an Introductory Horticulture class students reported they learned more in the class that used the PBL format (personal communication, D. Needham, May 29, 2007). However, investigation has also found many students expressed frustration because of the ill-structured nature required of the method. Stinson and Milter (1996) reported they frequently heard statements such as "what are we supposed to do," "how do we do that," or "if you would only tell me what you want, I would do it" (p. 41). Neo, Chye, Da Silva, and Hock (2000) noted with every change, resistance was the constant, and that students expressed concern about the PBL method, the role of instructors, assessment, need for group skills, and resources.

Problems-based learning requires students work in groups with the help of a tutor or facilitator. Needed areas of learning are identified and used as a guide to individualize study. Students must identify what they know and do not know and go beyond their textbooks to other resources in pursuit of knowledge (White, 1996 as cited in Burris, 2005). Knowledge and skills that are learned in the process are applied to the problem to evaluate the effectiveness of learning and to

reinforce and contextualize learning (Maxwell, Bellisimo & Mergendoller, 2001). Finally, learning that has occurred is integrated into the student's existing knowledge base.

The instructor takes on a much different role in PBL as compared to more traditional instructional strategies. Most often, the teacher becomes a facilitator, guide, or coach. The facilitator maintains the focus on learning, guides the process, meters the challenge, and provides appropriate feedback to each student and group (Gordon, Rogers, Comfort, Gavula, & McGee, 2001). Gallagher and Stepien (1995) described the instructor in PBL as a metacognitive coach; the challenge is to guide the students in discovery and data gathering to solve a problem, rather than providing content through direct instruction (lecture).

The intent of the instructor is to move students through a series of phases that should occur during the teaching process. The desired outcome is that students reach a conclusion and then have the opportunity to reflect on the decision making process. Several models highlight the process. Burris (2005) analyzed the Arends model, the Kain model and the Ryan and Millspaugh model (Figure 2). He found that the three models define each step or phase differently according to the tasks that make up the particular step.

Teaching using PBL provides students opportunities to hone students' critical thinking skills while practicing important teambuilding behaviors (Vernon, 1995). The student-centeredness, hands on nature and opportunities for application of acquired knowledge make problems-based learning an effective instructional method. Teachers must focus on the beginning of instruction and the closure of instruction. Setting the stage and establishing the case at the onset are critical to student success. Planning for and facilitating reflection is also a key to successful anchoring of knowledge that will be gained by the students.

Recommendations for Teaching with the Inquiry-Based Learning Method

While PBL experiences have a structured format of steps for phases for completion of a given task, inquiry based learning provides an open format that allows learners to formulate their own inquiry process. The general format of inquiry experience follows what Lawrence (as cited in Gerber, Cavallo, & Marek, 200l) proposed as the learning cycle, consisting of three phases: exploration, invention, and expansion.

To engage students in an inquiry based learning experience, instructors may consider what Colburn and Clough (1997) suggested; simply provide a laboratory activity prior to the discussion of the curriculum content. In science classrooms, Colburn and Clough proposed flipping the traditional sequence of instruction to begin with laboratory experiment, followed by instructor questions, and finally a discussion of the content, thereby allowing the instructor to "gain a better understanding of what students think after having done the activity" (p. 31) and before introducing the content. Further, they also recommended that teachers not use a standardized lab report form, but instead allow students to communicate their experience and findings in their own words. Conceding this open communication process may take more time for the teacher to interpret and provide feedback; these researchers concluded this process forces the students to articulate their results in a meaningful way. During the initial laboratory experience, an instructor's role must also shift from answering student's questions to asking

leading questions which encourage students to articulate solutions. Only after some experience with the inquiry method should a teacher pose a lab question for students to answer without a given set of procedures.

Arends Model (2004)	**Kain Model (2003)**	**Ryan and Millspaugh Model (2004)**
*	*	1. Explain why Problem-Based Learning is used.
Phase 1		2. Establish teams and assign team member roles
		3. Present "case" to students
	Step 1	4. Identify problem and stakeholders. Identify information to be learned.
	Step 2	5. Provide additional/background information related to the case.
		6. Identify formal learning objectives
Phase 2		7. Assign individual responsibilities
Phase 3		8. Provide instructional activities to assist in interpreting and understanding information
		9. Report on learning objectives within teams
	Step 3	10. Relate learning objectives to case solution
Phase 4		11. Exchange ideas among teams
	Step 4	12. Prepare/Present case resolutions
Phase 5	Step 5	13. Debrief the case
		14. Generalize from case experience through discussion

**steps not represented in model*

Figure 2: Comparison of Models of Problem-based Learning (Burris, 2005).

Owens, Hester, and Teale (2002) postulated there is also a role for inquiry based instruction in non-science classrooms. They concluded that successful initiation of inquiry learning required instructors to assist students in identifying the inquiry focus. Specifically, students needed to develop an "interest in the topic, have a plan for how to research it, and have a purpose for engaging in the project" (p. 617). Further, during the topic and question development, teachers must recognize that "questions act as the vehicle to understanding" (p. 616) and may help move students past the traditional research questions of "who, what, where, and when to asking 'what does this mean, and how can I use this information?" (p. 616). Similarly, Gerber, Cavallo, and Marek (2001) reported teachers who successfully integrated inquiry learning used activities

requiring students to seek out materials for the discovery process and that teachers relied heavily on questioning but did not reveal the concepts to students prior to their explorations. Although initially uncomfortable, the students develop their own explanations for the inquiry problem rather than simply accepting an explanation provided by the instructor. While instructors of science based classes may engage their students in inquiry learning on a daily basis, Owens, Hester, and Teale (2002) suggested it be used as complementary to other instructional methods.

Colburn (n.d.) stressed the importance of knowing one's students in order to assess their readiness for the various levels of inquiry learning. Structured inquiry activities should be used with students until the instructor determines the groups are ready for guided inquiry and the added task of developing a means for solving the given problem. Open inquiry may be compared to research projects undertaken by graduate students; the learner has the responsibility of formulating the problem, choosing an appropriate method to investigate the problem, securing the necessary tools and materials, collecting and analyzing data, and developing conclusions. Colburn noted the increased knowledge generation from multiple ideas being shared and analyzed within students grouped for that purpose. Another warning given was in assuming inquiry learning takes less preparation time on the part of the instructor; it often takes more.

Parr and Edwards (2004) reiterated the Owen, et al. emphasis on inquiry experiences as a means to push students to "go beyond the simple memorization of facts and regurgitation of information and into deeper understanding through identification and subsequent application of solutions to a specific topic" (p. 108). On the other hand, Wallace and Kang (2004) indicated that inquiry based instruction will be difficult to implement in the current education culture because of concerns regarding the preparation time needed, the perceived lack of rigor in inquiry work, and the perception that students lack maturity to handle the responsibility of directing their own learning. In contrast, the researchers also reported that instructors believed inquiry-based instruction will help students develop much needed skills in independent thinking and problem solving. Common wisdom indicates very little that is worthwhile is easily created or attained.

Conclusion

Both problems-based instruction and inquiry learning have shown evidence as promising practices in a variety of classrooms. If educators in agricultural education are going to add to their toolbox of teaching strategies by engaging students in more than just the problem solving approach, they should take deliberate action to provide students appropriate opportunities to direct their own learning activities and communicate the findings from those activities in their own words through PBL and IBL. Teaching strategies incorporating PBL and IBL may provide an avenue for engaging the non-linear natural thinking part of our problem-solving endeavors which are the keys to learning and life.

The integration of PBL and IBL will require the incorporation of constructivist learning theory into agricultural education teacher preparation programs. According to a study of ten exemplar agricultural education teacher preparation programs conducted by McLean and Camp (2000), the topics and courses offered in these peer-nominated programs reflected a foundation in behaviorist learning theory consistent with the professions traditions within positivist epistemology (Hillison, 1990). Therefore the profession may need to engage in a series of self-

reflective studies to examine current teaching practices and determine how these practices may be revised to reflect current theories of learning and knowledge construction.

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INFLUENCE OF CREATIVE PROBLEM-SOLVING UPON NINTH GRADE STUDENT ACHIEVEMENT AND SATISFACTION

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Abstract

The shift from an industrial era to an information era increased the importance of higher-order thinking and problem solving. The National Center on Education and the Economy (2007) concluded "the core problem is that our education and training systems were built for another era. We can get where we must go only by changing the system itself" (p. xx). Systemic change includes transforming pedagogy that foster creative problem solving and exploit learner satisfaction. The purpose of this study was to examine the proposition that students who participate in Creative Problem Solving (CPS) instruction would not differ significantly in achievement and satisfaction compared to students who participate in traditional instruction. With the current emphasis on high-stakes testing, student-centered instructional approaches must be scrutinized to ensure that they do not have a deleterious effect on subject matter acquisition. Additionally, the use of indirect instructional approaches such as CPS, must not frustrate students to the point of being harmful to the learning environment. To make this experimental comparison, ninth-grade students who enrolled in an Introduction to World Agricultural Science and Technology I course were randomly assigned into a class that was taught by CPS strategies and a class taught by traditional, teacher-dominated, instructional strategies. ANOVA was used to determine group differences. The researchers found that ninth grade students taught by CPS instruction do not differ in achievement and satisfaction compared to students taught by more teacher-centered approaches. If CPS instruction can indeed enhance student innovation and fluency of thought, then CPS instruction could be recommended over traditional instruction if its stakeholders desired to enhance creative thought.

Introduction/Conceptual Framework

The Problem Solving Approach (PSA) is not novel to agricultural education. Also referred to as Reflective Teaching, The Chain of Reasoning, The Scientific Method, or The Method of Science, this learner-centered approach to teaching and learning has been taught as a linear model that begins with students experiencing a felt need, followed by the identification of possible solutions (divergent thinking), an assessment of the proposed solution (convergent thinking), and then implementation and close scrutiny of the best solution (Crunkilton & Krebs, 1982; Dewey, 1916; Dewey, 1938; Hammonds, 1950; Krebs, 1967; Lancelot, 1944; Newcomb, McCrackin, Warmrod, & Whittington, 2004; Parr & Edwards, 2004; Stewart, 1950).

Although a great deal of research has been conducted and positional prose written on the PSA in Agricultural Education, research is lacking on specific instructional techniques which encourage divergent and convergent thinking. Carlile and Christensen (2004) recommend the initial step in theory building is for the researcher to "observe phenomena and carefully describe and measure what they see" (p. 2). The theoretical foundation of this research is descriptive-to carefully add to descriptive theory beginning with observation, categorization, and association.

Two questions often surface when the PSA and divergent/convergent thinking strategies are discussed. First, can one be a good problem solver without being a good creative thinker? Second, can one be a great problem solver without being a great creative thinker?

Torrance (1974) posited that creativity is a process of developing sensitivity to the many problems, knowledge gaps, missing elements, disharmonies of life, and so on; identifying the difficulties; searching for solutions; making guesses of formulating hypotheses about the deficiencies; testing and retesting these hypotheses, and possibly modifying and retesting them; and finally, communicating the results. Watanabe and McGaw (2006) concluded that knowledge and skills in school subjects such as languages, mathematics, and science are an essential foundation for preparing students for life. However, a much wider range of competencies is needed for students to be well prepared for the future. Problem solving skills…are an example of this wider range of competencies (p. 3). One reason that creativity is so multifaceted is because there are so many contributing factors to its development and expression. These factors include personal factors (cognitive, motivational, and attitudinal), social factors, and environmental factors (Basadur & Hausdorf, 1996). Narrowing the topic of CPS into a definable, usable, and measurable instrument can be a daunting challenge.

Scott, Leritz and Mumford (2004) found a number of programs designed to enhance creativity differ with respect to domain specificity, however they all contain certain aspects of creativity, whether the focus is on divergent thinking, problem solving, or meta-analysis. Divergent thinking activities are designed to encourage students to generate multiple alternative solutions to problems, as opposed to only one correct solution. Convergence is the process of merging the many ideas resulting from divergence into the most appropriate application for the particular problem or situation. The creative thinking process involves a framework with three components: understanding the problem, generating ideas, and planning for action (Maraviglia & Kvashny, 2005). The initial component involves divergent thinking, while the final two components involve convergent thinking. There are three stages in the convergent component of the process (understanding the problem) including data or mess-finding, data-finding, and problem-finding. In the second component of generating ideas, participants develop possible solutions to the problems which surfaced in the previous component. The final component, planning for action, involves the following two stages, solution-finding and acceptance-finding.

According to Alexander, Parsons, and Nash (1996), the characteristics of creative people can be classified into one of four categories. These categories include (1) biological components of genetics, neurology, anatomy, and physiology; (2) psychological components of personality, motivation, and emotional well-being; (3) sociological components of society, culture, and economy; and (4) knowledge components of conceptual and general strategic knowledge. Cognitive psychologists recognize that individuals react with their environment in demonstrably different ways in regard to how information is used to solve problems. However, although variables of race and social standing have been consistently associated with varying levels of creativity, they are less clearly associated with the potential for change (Moreno & Hogan, 1976). Therefore, the focus of CPS programs must remain on enhancement of creative problem solving ability, rather than racial and social barriers that may exist.

Most would agree that the creative process is continuous. An integral part of all human intellectual performance, it increases through conscious intent, and it is a high-order intellectual

process. Wheeler, Waite, and Bromfield (2002) refer to the Waller Model for Creative Process, which consists of four key stages. During the first stage, preparation, an individual logically and systematically examines an identified problem. In the next stage of incubation, as the individual lays the problem aside, he or she subconsciously dwells on it until a so-called "Eureka" moment occurs. As sudden insight emerges into one's own consciousness, the third stage of illumination takes over. Finally, verification of the solution results from application of the solution to the original problem for affirmation.

Virtually all CPS models support the stance that any CPS process is not complete until both divergent and convergent thinking have occurred. Basadur and Hausdorf (1996) refer to the three major phases of creative problem solving that include problem-finding, problem-solving, and solution implementation. Interestingly, a two step process known as ideation-evaluation occurs within each of these phases. Ideation involves the generation of various options, points of view, and exceptions, minus critical judgment or analysis, which encompasses the divergent process. During the evaluation part of this equation, these freely developed thoughts are screened and selected, based on merit, through the convergent process. Thus, participants acquire skills in various techniques of both a divergent and convergent nature through practice, rather than mere abstract discussion.

According to Treffinger (1995), creative potential exists within all individuals. Furthermore, creativity is usually manifested according to the interests, preferences, and styles of individuals. Through personal assessment and deliberate intervention, in the form instruction, individuals can make better use of their creative styles, enhance the level of their creative accomplishment, and more fully realize their creative potential. The elements of CPS, as a system, enable individuals to use information about tasks, important needs and goals, and important inputs, to carry out the process for decisions that will lead to meaningful outcomes. Maraviglia and Kvashny (2005) concluded that the CPS model is the most significant and powerful framework for the enhancement of creative thinking.

This deliberate teaching of processes for quality thinking should be a major ingredient for creating positive educational experiences. However, increasing pressure to meet performance standards in the state and national accountability systems has compromised flexibility of classroom instructional strategies. Although the accountability system focuses on core curriculum areas of math, science, social studies, and language arts; all academic support areas have been mandated to compliment efforts in core curriculum areas, thus inhibiting creative instruction throughout the system (Osborn & McNess, 2002). These externally-mandated state and national standards necessitate that agricultural educators articulate their programs to meet both the academic and so-called "soft" skills crucial to student success in the workforce (Dailey, Conroy, & Shelley-Tolbert (2001).

In 2007, Hanson, et al., found that CPS instruction benefited sixth grade students in a natural resources unit. Regular students taught by CPS instruction had significantly greater end-of-unit scores compared to students taught by traditional instruction. No difference was found between regular and gifted and talented students taught by CPS instruction. Both gifted and talented and regular students taught by CPS instruction were significantly more satisfied with the delivery of instruction, than students taught by traditional instruction.

Student-centered instructional methods or approaches such as CPS reduce the amount of face-to-face classroom time that teachers have available to teach content (Bonwell & Eison, 1991; Burden & Byrd, 2007; Santrock, 2004). Student-centered approaches have also been criticized as being less effective with certain types of learners (Feng, 1996). The present study was conducted to provide information about the influence of CPS on ninth grade learners. To date, a paucity of research exists in agricultural education regarding the effect that CPS instruction has upon both student achievement and learner satisfaction.

Purpose and Research Questions

The purpose of this study was to examine the proposition that ninth-grade agricultural science students who participate in Creative Problem Solving (CPS) instruction would not differ significantly in subject matter achievement and satisfaction compared to students who participate in traditional instruction. The following research questions guided the study: (1) Does a 16-week CPS curriculum diminish students' attainment of low-level cognitive knowledge? (2) Does a 16-week CPS curriculum diminish students' attainment of high-level cognitive knowledge? (2) Does a 16-week CPS curriculum diminish students' satisfaction with the instructional process?

Procedures

The research design selected for this study was an experimental, randomized subjects, posttest only, control group design. Posttest only design is consistent with true experimentation, as subjects are not influenced on the posttest by test familiarity carried forward from the pretest (Tuckman, 1999). Students were randomly assigned into one of two groups or classes, and then classes were randomly assigned into either the control or treatment group. The data for this study were collected in the fall of 2006. A measurement of student satisfaction was administered at the conclusion of the study. The actual experiment was conducted by one certified agricultural science and technology teacher over the course of approximately 16 weeks during the semester, which began on Wednesday, August 16 and ended on Friday, December 1. Posttest data to measure low-level and high-level cognition, as well as student satisfaction among the subjects, were collected at the end of the study, which concluded on Friday, December 1.

The course was delivered to both the treatment and the control groups in an identical setting by a single teacher. The teacher was trained in CPS instruction during 14 days of professional development delivered by a curriculum/instruction specialist from the Region 14 Education Service Center in Abilene, Texas. The curriculum/instruction specialist observed the teacher on a weekly basis throughout the 16 week study to ensure that the teacher followed the planned mode of instruction. Both groups experienced the same curriculum on the same day, only at different times of the day. An audio tape of selected lessons was used to verify integrity of the methods. While most of the course around which this study was designed did involve a classroom setting, laboratory instruction was conducted in an agricultural mechanics laboratory, a greenhouse, and an agricultural science land laboratory, depending on the objectives for the lesson of the day. The control group received the curriculum through traditional instructional strategies of lecture, discussion, visual aides, and teacher-directed questioning. However, the treatment group was presented the curriculum through the use of various divergent, convergent,

and whole brain activities. During the course of the study, students in the treatment and control groups were encouraged not to share content or procedures utilized within their respective groups. However, in small school districts the size of Roscoe ISD, it is unrealistic to assume that some degree of interaction did not occur. Campbell and Stanley (1966) recognized history and selection interaction can, if not controlled, jeopardize the experiment's internal validity.

The 40-item posttest of technical subject matter competence was developed by the researchers, the course instructor, and the curriculum/instruction specialist from the regional education service center. This test consisted of 10 true/false and 25 multiple choice questions for low-level cognition and 5 short answer, open-ended questions for high-level cognition. The low-level cognition questions were taken directly from material in the units, while the high-level cognitive questions required application of course content in regards to providing solutions to problems or situations. The representative from ESC 14 developed a scoring rubric that was used by her and the teacher to score the high-level cognition questions more objectively.

To ensure content and face validity of the technical subject matter test, a panel of university-level experts reviewed the instruments prior to their actual administration. Revisions were made to the instruments upon recommendation. Post-hoc reliability was established through SPSS, using the Kuder-Richardson-20 coefficient. The post-hoc reliability of the 35 dichotomously-scored items was r=.90.

To measure satisfaction, participants in the study were asked to evaluate the course using a satisfaction instrument designed by Brashears (2004). This instrument measured student satisfaction in the three areas of clarity, delivery, and content. Each section was comprised of five questions which allowed students to respond using a Likert-type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree). A previously-established post-hoc reliability calculation revealed $\acute{\alpha}$ = .83 for clarity, $\acute{\alpha}$ = .75 for delivery, and $\acute{\alpha}$ = .80 for content, resulting in an overall post-hoc total of $\acute{\alpha}$ = .90 (Brashears, 2004). The high-level cognitive questions were scored independently by both the instructor and a curriculum/instruction specialist from a regional education service center. The two then met face-to-face and compared their scores, discussed variations, and agreed upon a final score.

After results were tabulated for each test, the results were entered in the Statistical Package for the Social Sciences (SPSS) for Windows 12.0 data analysis program (Field, 2000). ANOVA was used to determine statistical significance. Tests for statistical significance were set *a priori* at the .05 alpha level. ANOVA measures the ratio of systematic variation to unsystematic variation through a measure known as the F-ratio. The assumptions of ANOVA were also examined and met.

Findings

Research Question One: Does a 16-week CPS curriculum diminish students' attainment of low-level cognitive knowledge? As reported in Table 1, the average mean score for low-level cognitive knowledge was slightly higher for students in the CPS group (M = 50.40, SD=8.15) than for students in the traditional group (M=50.20, SD=12.91).

Table 1
Descriptive Summary Table for Low-Level Cognitive Knowledge

Group	n	M[1]	SD
CPS	10	50.40	8.15
Traditional	10	50.20	12.91
Total	20	50.30	10.51

[1] 70-point scale

A one-way analysis of variance was conducted to evaluate the relationship between low-level cognition and the two treatment levels of the independent variable. The ANOVA revealed that the CPS class and the traditional class did not differ significantly in their post-treatment low-level cognition scores (F= .002, df= 1,18, p=.97). The relative magnitude of the experimental treatment was negligible (Cohen's d= .03). The results of the one-way ANOVA revealed that the CPS curriculum did not diminish students' attainment of low-level cognitive knowledge. In fact, students in the CPS group had slightly lower mean scores on the state standardized eighth grade test in language arts, math, science, and social studies. Additionally, these students had a lower eighth grade GPA.

Research Question Two: Does a 16-week CPS curriculum diminish students' attainment of high-level cognitive knowledge? As reported in Table 2, the average mean score for high-level cognition was higher for students in the CPS group (M = 14.80) than for students in the traditional group (M = 12.60).

Table 2
Descriptive Summary Table for High-Level Cognition.

Group	N	M[1]	SD
CPS	10	14.80	5.77
Traditional	10	12.60	5.60
Total	20	13.70	5.65

[1] 30-point scale

A one-way analysis of variance was conducted to evaluate the relationship between high-level cognition and the two treatment levels of the independent variable. The ANOVA revealed that the CPS class and the traditional class did not differ significantly in their post-treatment high-level cognition scores (F=.748, df=1,18, p=.398). The relative magnitude of the experimental treatment was medium (Cohen's d=.41). The results of the one-way ANOVA failed to support the research hypothesis that high-level student cognition would be significantly greater for students exposed to CPS than for students exposed to traditional methods of instruction.

Research Question Three: Does a 16-week CPS curriculum diminish students' satisfaction with the instructional process? As reported in Table 3, the mean score for total student course satisfaction was greater for the CPS group (M=53.20) than the traditional group (M=47.50).

Table 3.
Descriptive Summary Table for Total Course Satisfaction.

Group	n	M[1]	SD
CPS	10	53.20	6.00
Traditional	10	47.50	14.26
Total	20	50.35	11.04

[1] 75-point scale

A one-way analysis of variance was conducted to determine total satisfaction for the course of instruction including both treatment levels. The ANOVA revealed that the CPS class and the traditional class did not differ significantly in their post-treatment course satisfaction scores ($F=1.357$, $df=1,18$, $p=.26$). The relative magnitude of the experimental treatment was medium (Cohen's $d=.55$). The results of the one-way ANOVA provided evidence that students taught by creative problem solving were not any less satisfied than students who were taught by traditional methods of instruction.

Conclusions/Discussion/Recommendations/Implications

These findings clearly indicate that CPS instruction does not have a deleterious effect upon student attainment or satisfaction. One concern with more student-centered approaches to instruction has been with a real or perceived increased frustration level of learners, particularly those who are more extrinsically motivated (Amabile, 1983; Hennessey & Amabile, 1987; Hennessey & Amabile, 1988). These findings lead one to conclude that such concerns are not warranted, however the authors acknowledge that the design of this study would not meet current 'gold-plate' by USDE standards (2003). Carlile and Christensen (2004) would likely recommend continued theory building through descriptive observation, categorization, and association.

The teacher's ability to develop a creativity 'safe place' in the classroom is a recognized threat to external validity. Amabile and Hennessey (1992) listed six environmental conditions which stifle creativity-including constant evaluation, competition, reward, restricted choice, surveillance, and an extrinsic orientation towards assignments. Did this teacher have the ability to encourage students to take risks by feeling free to share their thoughts? Was a classroom environment established where ambiguity was tolerated? Only future replications of this study will answer these questions.

The variables under investigation of this study were secondary to the primary goal of CPS instruction, that being the enhancement of innovation and fluency of divergent thought. Consequently, this research is part of a larger study which sought to determine the effect of the treatment upon a quantifiable creative thinking measure.

Halpern (1996) provided some great advice to collegiate students who have an interest in enhancing their own creativity. He stated: "Cultivate a love of learning, reward your own creative efforts; take the college courses that will fill your mind with new thoughts. . . Creative endeavors result from hard, intellectual work that is self-motivated and self-monitored. Don't be

afraid to engage in it (p. 379)". Perhaps this would be good advice for all of us in agricultural education.

Twomey (2006) in an analysis of the 2003 PISA problem solving results noted that 55% of U.S. 15 year-olds scored at the problem solving level I or below. Friedman (2005) advised that we have entered into a third era-which he called Globalization 3.0; one that will reward creative problem solving. As a part of the 2007 revision of the career/technical education portion of the secondary school taxonomy (Bradby, 2007), agricultural education in the secondary schools has a unique advantage in teaching creative problem solving by combining the knowledge of science and mathematics and the context of agricultural technology.

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AGRICULTURE TEACHER PERCEPTIONS OF PREPARATION TO INTEGRATE SCIENCE AND THEIR CURRENT USE OF INQUIRY BASED LEARNING

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Abstract

The purpose of this study was to determine the perceived competence of agricultural education teachers in integrating science and use of inquiry based teaching techniques in agricultural education programs. Objectives included describing the perceived competence / preparation level of agricultural education teachers to integrate science into the agricultural education curriculum, describing current and planned levels of science integration in the agricultural education programs, and describing the use of inquiry based teaching techniques in agricultural education programs. The population for the study was all secondary agriculture teachers in Florida. A total of 217 teachers participated for a 61.1% response. It was found that although agriculture teachers feel prepared to integrate science, they also believe more should be done to prepare future teachers to do so. Furthermore, nearly three fourths of the participants intended to increase their level of science integration. Finally, teachers reported using teacher oriented inquiry strategies nearly three times per week, while they reported using student oriented inquiry nearly once per month.

Introduction

The integration of science and other academic content across the curriculum has been central to legislative attempts at educational reform since the National Defense Education Act was instituted in 1954. The latest of these efforts is directed specifically at Career and Technical Education through the Carl D. Perkins Career and Technical Education Improvement Act of 2006. This legislation carries important ramifications for the future curricular focus of Career and Technical Education (CTE) programs. Among these are the "Core Indicators of Performance for Career and Technical Education Students at the Secondary Level" (U.S. Congress, 2006). The six indicators established by the legislative language outline the minimum areas in which states are to be held responsible for measuring CTE student performance. The first of these indicators highlights the critical need for Agricultural Education programs to integrate core academic content; as CTE program funding will be partially based on standardized assessments designed to measure student mastery of academic content standards. Specifically, the first Perkins Core Indicator requires the measurement of: ''Student attainment of challenging academic content standards and student academic achievement standards, as adopted by a State … and measured by the State determined proficient levels on the academic assessments" (U.S. Congress, 2006, p. 14).

Concurrent with the new Perkins language, the No Child Left Behind (NCLB) legislation mandates that beginning this year, states must measure student achievement in science at least four times during a student's progression from third to twelfth grade (USDE, 2006). The NCLB

mandate, coupled with the Perkins legislation indicates the imperative nature of expectations that agriculture teachers join their science education colleagues in preparing students to meet science achievement standards. Agricultural education research has shown that on standardized achievement exams, students participating in agricultural education courses perform as well as their counterparts (Connors & Elliot, 1995), or better than their counterparts who did not complete instruction in Agriculture (Chiasson and Burnett, 2001). The question remains however, are agriculture teachers adequately prepared to integrate scientific concepts consistently and systematically?

The decision to integrate academic concepts in the agriculture curriculum should not be based solely on legislative expectations. It has also 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). Many would include these characteristics as basic premises of the agricultural education philosophy. Furthermore, previous findings suggest agriculture teachers believe integrating science in the agriculture curriculum aids students in making connections between scientific principles and agriculture (Enderlin and Osborne, 1992; Myers & Washburn, 2006; Thompson, 1998). These researchers also found that agriculture teachers perceive integration of science has the potential to increase program enrollment and stakeholder views of the program.

The importance and perceived benefits of science integration in agriculture are well-documented. Since the late 1980's, considerable research has produced mixed findings regarding agriculture teachers' perceived level of preparation to effectively integrate science. In Wilson, Kirby and Flowers' (2001) study of 126 North Carolina agriculture teachers, prior to any intervention, low self-perceived knowledge in competency areas essential to biotechnology instruction were reported. Conversely, Balschweid and Thompson (2000) found that after an intensive preparation in science integration and mandated experience in collaboration with a science teacher during their teaching internships, pre-service teachers had a high degree of confidence in their ability to integrate science principles in their instruction. Thompson (1998) found that while participants in the National FFA Agriscience Teacher of the year awards program felt prepared to integrate, they also believed more inservice was needed in the profession on how teachers could integrate science. Regardless of level of preparation however, agriculture teacher perceptions in Florida regarding science integration reflected beliefs that insufficient planning time, lack of requisite materials, and insufficient funding were barriers likely to prevent integration of science concepts (Myers and Washburn, 2006).

If efforts to more comprehensively integrate science in agriculture are to be fruitful, current areas of emphasis in the science education community should be heeded. Considerable attention has been given in the science education literature to the concept of Inquiry-Based Learning (Rutherford & Ahlgren, 1990; NSES, 1996; NSTA, 1997). The National Research Council (1996) provides the following description of scientific inquiry leading to inquiry-based learning:

> Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world. (p.23)

In their 2007 position statement, the National Science Teachers Association (NSTA) stated "inquiry-based laboratory investigations at every level should be at the core of the science program and should be woven into every lesson and concept strand" (NSTA, 2007). Dunbar (2002) offered the following definition of inquiry: "scientific inquiry involves posing questions about the natural world and investigating observed phenomena; students are guided to use multiple science process skills, experimentation, argument, and explanation as they find satisfactory answers to their questions" (p. 4). The NSTA suggested that "at the high school level, all students should be in the science lab or field, collecting data every week while exploring science labs." (p. 2).

The present study was based on the extensive theoretical science education literature pool which calls for wholesale educational reform in the systematic implementation of inquiry based learning. If agricultural educators are to effectively integrate science instruction, a reasonable assumption is that inquiry-based learning should be central to such efforts. Unfortunately a dearth of research exists regarding the current level of inquiry based learning implementation in the agricultural education curriculum. If we are to effect meaningful change in agricultural education, research is needed to establish the current status of science integration in agriculture generally, and the implementation of inquiry based learning more specifically

Purpose and Objectives

The purpose of this study was to determine the perceived competence of agricultural education teachers in integrating science and use of inquiry based teaching techniques in agricultural education programs. The objectives of the study were as follows:

1. Describe the perceived competence / preparation level of agricultural education teachers to integrate science into the agricultural education curriculum.
2. Describe current and planned levels of science integration in the agricultural education programs.
3. Describe the use of inquiry based teaching techniques in agricultural education programs.

Methods

This statewide study used a descriptive survey research design. The instrument used in this study was based on existing instruments used by other researchers in this field of study (Dunbar, 2002). The researchers modified items slightly when appropriate to meet the objectives of the study and to address the programs of this state. Teacher responses were measured on a Likert-type scale. A panel of experts consisting of faculty, administrators, and graduate students from the University of Florida reviewed the instrument for face and content validity. The

authors of the original instrument report internal consistency using Cronbach's alpha of 0.90 (Dunbar, 2002). A post-hoc reliability analysis of this administration of the slightly revised instrument revealed a Cronbach's alpha coefficient of 0.81.

The population for the study consisted of all agricultural education teachers in Florida. The population frame of the study was established by using the state agriscience teacher directory (N=355). Data were gathered from all members of the population. Whereas this is a census study the findings are not generalizable to individuals beyond this population and only descriptive statistics were used to analyze the data.

In an attempt to address non-response error, a total of six respondent contacts were made (Dillman, 2000). These included a pre-study electronic mail contact, instrument mailings, and reminders via both electronic and land mail. Furthermore, 10% of the non-respondents were randomly selected and contacted via telephone and completed the questionnaire verbally(Ary, Jacobs, Razavieh, & Sorensen, 2006). Respondents and non-respondents were compared and no statistically significant difference was found. A total of 217 respondents returned questionnaires for a 61.1% response rate.

Findings

The gender demographic of the respondent group was found to be approximately even with a slight majority (54%) being male. Respondents reported a mean of slightly over 15 years of teaching experience. A majority (52.3%) reported teaching in high schools with almost a third (32.1%) teaching in middle school agricultural education programs. The remaining respondents (15.5%) reported teaching in blended, both middle and high school, agricultural education programs. The largest percentage of teachers reported their highest level of education as a bachelor's degree (37.5%), followed by a master's degree (26.6%), bachelor's plus some graduate courses (20.3%), master's degree plus some additional graduate courses (12.5%), and 3.2% of the teachers reported holding either a specialist or doctoral degree. Less than half (44%) of the teachers reported that their undergraduate major was agricultural education.

The first objective of this study was to describe the perceived competence / preparation level of agricultural education teachers to integrate science into the agricultural education curriculum. Table 1 illustrates that most respondents reported that they feel prepared to teach both integrated biological science concepts (79.9%) and physical science concepts (71.4%). When asked to comment on teacher preparation programs, just over half (57.6%) suggested that students in those programs be required to complete more science courses. Furthermore, respondents suggested that students complete early field experiences (64.6%) and student teaching internships (79.6%) with teachers who integrate science. Responding teachers overwhelmingly supported (93.6%) the inclusion of instruction on how to integrate science concepts and principles in teacher preparation programs.

Table 1
Preparation To Integrate Science

Statement	%A	%N	%D
Teacher preparation programs in agriculture should provide instruction for undergraduates on how to integrate science concepts/principles in agriculture.	93.6	5.1	1.4
I feel prepared to teach integrated biological science concepts.	79.9	10.6	9.5
When placing student teachers, teacher preparation programs should expect cooperating teachers to model science integration.	79.6	15.7	4.6
I feel prepared to teach integrated physical science concepts.	71.4	11.1	17.6
Teacher preparation programs should require that students conduct their early field experiences with a teacher who integrates science.	64.6	27.0	8.4
Teacher preparation programs in agriculture should require students to take more science courses.	57.6	25.3	17.1

Note. *n* = 217. Original scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree or Disagree, 4 = Agree, 5 = Strongly Agree. Responses were collapsed into Disagree and Agree.

The second objective of this investigation was to describe current and planned levels of science integration in the agricultural education programs. Most respondents (92.8%) indicated that they have integrated science into their agricultural education program. Almost three-fourths (74.6%) indicated they plan to increase the amount of science integration in their curriculum. While 24.4% stated that they plan no change in their current level of science integration. In response to an open-ended question, 42 respondents indicated that pressure to address state standards and administrator pressure caused them to integrate science into their program. (see Table 2). Several also noted one reason they integrated science was that agriculture is a science and it just makes sense to do so (*f* = 29) and the changing nature of the agriculture industry demands the integration (*f* = 25). One respondent noted that integration is "necessary to validate the relevance of the subject to exist in public schools." Another commented "I can not see how you can teach agriculture without integrating science." Regarding the changing nature of the agriculture industry, one respondent replied "It [integration] is the only way to teach agriculture in the 21st century in which biotechnology and high order science skills and knowledge have become so critical to success in any agriculture career."

Table 2
Most Significant Factors That Caused Teacher To Integrate Science

Factor	*f*
State standards / Pressure from administrator	42
Agriculture is an (applied) science, it's the natural thing to do	29
Changing nature of the agriculture industry demands it	25
Agriculture course meeting science credit for graduation	19
It increased student learning	16
It increased student enrollment	15
I (the teacher) enjoy it	12
Students enjoy it	12

Note. Respondents were allowed to indicate more than one factor.

On a second open-ended question asking respondents to identify what they would need to integrate more science into their programs, the most frequently listed items dealt with increased funding for supplies and equipment ($f = 72$). (See Table 3) Also reported were the need for curricular materials and/or textbooks that highlight science integration ($f = 56$) and the need for training on how to integrate ($f = 33$).

Table 3
Items Needed To Integrate More Science

Item	*f*
Funding for supplies and equipment	72
Curriculum and textbooks highlighting integration	56
Training on how to integrate science	33
More time (planning time and preparation time)	30
Improved facilities (laboratory space, storage)	24
Smaller class size	7

Note. Respondents allowed to indicate more than one factor.

The third and final objective of this research was to describe the use of inquiry based teaching techniques in agricultural education programs. This was achieved through the use of two difference scales, the Teacher Inquiry Scale and the Student Inquiry Scale (Dunbar, 2002). The Teacher Inquiry Scale asked respondents to indicate the frequency in which they engage in inquiry activities in their classrooms (Table 4). A grand mean of 2.70 (SD = 0.78) for this scale was calculated from teacher responses. This can be interpreted as teachers engaging in inquiry-type teaching strategies almost three times a week.

Table 4
Teacher Inquiry Scale (n = 217)

On average, to what extent do you:	Never[b]	1x per week[c]	2x per week[d]	3x per week[e]	4x per week[f]	5x per week[g]
	Percent					
Use open-ended questions that encourage observation, investigations, and scientific thinking.	0.5	8.6	21.8	29.9	17.8	21.3
Encourage students to initiate further investigation.	1.0	14.1	27.8	25.8	17.7	13.6
Identify agricultural situation/issues that can be investigated at varying levels of complexity.	1.5	19.2	29.3	30.8	13.1	6.1
Use a textbook as the primary method for studying agriscience.[a]	2.5	1.5	17.3	27.4	39.6	11.7
Facilitate and encourage student dialogue about science.	3.6	11.7	23.4	28.9	15.2	17.3
Encourage students to defend the adequacy or logic of statements and findings.	5.1	20.2	20.7	24.7	14.1	15.2
Make readily available to students a wide variety of resource materials for scientific investigations.	10.1	12.6	24.2	16.7	16.2	20.2
Encourage students to design and conduct experiments.	17.9	32.3	17.9	13.8	9.2	8.7
Ask a question or conduct and activity that calls for a single correct answer.[a]	22.4	11.2	25.5	21.4	15.8	3.6

Note. Grand mean = 2.70 (SD = 0.78)
[a] This item reverse coded for analysis
For computation of grand mean: [b] Coded as zero, [c] Coded as one, [d] Coded as two, [e] Coded as three, [f] Coded as four, [g] Coded as five

The Student Inquiry Scale asked respondents to indicate the frequency in which students are asked to engage in various inquiry activities (Table 5). The grand mean for this scale was calculated as 2.97 (SD = 0.53). This can be interpreted as, on average, students were asked to engage in inquiry-type activities almost once per month.

Table 5
Student Inquiry Scale (n = 217)

How often do you ask students in your classroom to:	Percent					
	Never[b]	1x per year[c]	1x per semester[d]	1x per month[e]	1x per week[f]	1x per day[g]
Ask questions during investigations that lead to further ideas, questions, and investigations.	0.0	4.1	7.6	16.8	45.2	26.4
Offer explanations from previous experiences and from knowledge gained during investigations.	0.5	3.5	10.6	19.2	41.4	24.7
Make connections to previously held ideas (or revise previous conceptions/assumptions).	1.0	3.0	9.6	20.2	39.4	26.8
Communicate investigations and explanations to others.	2.0	3.1	15.8	29.1	36.2	13.8
Use data to construct a reasonable explanation.	2.0	8.1	14.2	28.9	37.1	9.6
Choose appropriate tools for an investigation.	4.1	3.0	15.2	21.8	38.1	17.8
Use drawing, graphing, or charting to convey new information from an agriscience activity.	4.6	6.6	21.3	28.4	32.5	6.6
Use investigations to satisfy their own questions.	4.6	7.1	14.7	29.4	33.0	11.2
Seek and recognize patterns (trends in data).	4.6	9.2	19.4	28.1	33.2	5.6
Listen carefully to peers as they discuss scientific investigations.	5.1	8.2	16.3	25.5	31.6	13.3
Memorize scientific facts or information separately from activities. [a]	6.1	28.3	25.8	14.6	6.1	19.2
Wait for the teacher's explanation before expressing an observation or conclusion. [a]	8.2	30.3	21.5	9.7	5.1	25.1
Follow a set series of steps to get the right answer to a question. [a]	14.3	43.4	27.0	8.2	4.6	2.6
Wait to act until the teacher gives instruction for the next step in the investigation. [a]	14.5	39.4	19.7	13.0	6.2	7.3

Note. Grand mean = 2.97 (SD = 0.53)
[a] This item reverse coded for analysis
For computation of grand mean: [b] Coded as zero, [c] Coded as one, [d] Coded as two, [e] Coded as three, [f] Coded as four, [g] Coded as five

Conclusions, Recommendations, Implications

Conclusions of this census study were based on the responses of 217 Florida agriculture teachers. Although the integration of science into the agriculture curriculum is a concern in other states, the reader is reminded to exercise caution when generalizing the results beyond the population of this study.

The "typical respondent" in this study was a male teaching in a high school with over fifteen years of teaching experience. The "typical respondent" was also most likely to hold a bachelor's degree only and that degree was likely not in agricultural education. As Florida agricultural education state staff and teacher educators prepare and deliver professional development opportunities to assist teachers in integrating science, these findings will be useful in guiding their planning decisions. When working with a majority of teachers who did not follow the traditional bachelor's degree in agricultural education pathway to teaching, it is important to keep in mind that differences in philosophy and view of the purpose of agricultural education are likely present.

Regardless of their pathway to enter the teaching profession, respondents to this study overwhelmingly agreed (93.6%) that teacher preparation programs in agriculture should provide instruction for undergraduates related to preparation for integrating science. Paired with the finding that nearly 80% of teachers believe cooperating teachers should model for teaching interns how to integrate science, it can be concluded from this finding that in-service teachers see the current and future importance of science integration. This finding should also serve as an important recommendation to the researchers as they consider teaching intern placements in the future. If this recommendation is to be implemented however, a diagnostic tool intended to evaluate the degree of science integration would be extremely useful in assessing the characteristics of teaching internship sites and other programs. Additional research is needed to develop such an instrument or method.

The majority of teachers responding they feel prepared to integrate biological science concepts (79.9%) and physical science concepts (71.4%). The higher degree of perceived preparation and the higher degree of preparation in biological than physical sciences is consistent with previous findings (Thompson, 1998). Combining these findings with the response from over 90% of teachers that they have already integrated science to some degree, the researchers conservatively concluded that at least limited integration of science is the norm rather than the exception in the 217 classrooms represented by these respondents. Furthermore, with nearly 75% of respondents indicating their intention to increase their level of integration and no respondents anticipating a decrease in integration, it can be concluded that in coming years, the degree of science integration will expand in Florida agricultural education. Longitudinal research with the same participants would result in meaningful analyses in determining the degree to which teachers follow through with their stated intentions of increased future integration. If levels of science integration are to expand for nearly 75% of the responding teachers, a reasonable assumption to draw is that expanded professional development in effective integration strategies will be needed.

In analyzing open ended responses regarding the factors that motivated students to initiate integration of science in their curricula, three of the most frequently cited factors related to some external pressure to integrate. These included state standards and administrative expectations, the changing nature of the agricultural industry, and the fact that courses being offered for science credit necessitated integration. Conversely, five factors related more to self-expectations of the professional teacher. These included the notion that as an applied science, agriculture should be taught via science integration, that integration increases student learning, enrollment and enjoyment, and that the teacher enjoys teaching using integrated science. These perceptions of teacher motivation to change behavior establish an important basis for further research. It can reasonably be concluded that more effective and lasting integration will be achieved if teachers appreciate the intrinsic value of integration rather than the need to respond to external pressures to do so. Additional empirical evidence is needed to either refute or confirm teacher opinions regarding student response to science integration to build upon the findings of Balschweid (2002) in one such study.

Previous survey research has examined the barriers teachers face in integrating science (Myers & Washburn, 2006; Balschweid & Thompson, 2000 and 2002; Wilson, et. al., 2002; Thompson, 1998). In response to an open ended question, teacher respondents in the present study independently identified many factors consistent with previously examined barriers. These included limited funding, lack of curricular resources, professional development, planning and preparation time, improved facilities, and smaller classes. While some of these items are typical teacher responses, others are truly reflective of the real challenges faced by agriculture teachers in Florida. Anecdotal evidence in this particular state supports legitimate concerns that capital and operating budgets for agricultural programs are extremely limited and school overcrowding results in either large classes or teachers choosing to teach during planning time. If progress is to be made in moving the integration of science to an advanced level in Florida, agricultural leaders must be equipped with empirical evidence to effect change with these resource oriented barriers to science integration.

The teacher and student inquiry scales adapted from Dunbar (2002) hold promise as an important starting point for a continuing line of investigation into the current status of inquiry based learning in agricultural education. The present study found that teachers used inquiry oriented strategies on average between two and three times per week. Furthermore, on average they asked students to engage in inquiry based strategies nearly once per month. These findings lead the researchers to conclude that while the participants in this study may recognize the value of inquiry based strategies, they tend to implement them in a rather teacher centered as opposed to student centered way. In order to prepare agriculture teachers to meet the National Science Teachers Association's (2007) call for students to be engaged weekly in inquiry based data collection and learning, notable changes will be needed in agriculture teachers' current practice in Florida. Addressing previously discussed findings regarding facility and class size challenges may prove beneficial in increasing the degree of student oriented inquiry. However, professional development will be needed to assist teachers in developing strategies to transition from student oriented inquiry only once per month to an increased level of frequency.

Using these scales, a single measure of the level of inquiry agriculture teachers report means little. Additional examination using this instrument over time is recommended to assess

changes in level of integration. The teacher and student inquiry scales are potentially useful in evaluating differences between groups of teachers with differing levels of experience, different program types, or with varying pathways to the profession. This tool also holds promise in measuring teacher change prior to and following interventions to assist them in enhancing their proficiency with inquiry based learning.

In order to answer the call of legislative efforts to integrate core academic content as well as calls from the science education community to increase the implementation of inquiry based learning, additional work and diligence will be required in the agricultural education community.

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Problems and Inquiry-Based Learning: A Theoretical And Practical Synthesis

A Critique by
Jim Flowers, North Carolina State University

Problem-based learning and inquiry learning approaches have long been promoted as effective approaches to teaching agriculture at the secondary level. Certainly, the applied nature of teaching agriculture in a contextual setting would point toward these types of approaches as being particularly applicable. While we probably have not had the amount of research in agricultural education related to inquiry and problem-based learning as perhaps should have been conducted, the research we have seems to indicate that agricultural topics can be effectively taught using these approaches.

This paper is the result of collaboration of four authors from four different universities and states. So we can do collaborative work with our colleagues! The paper does a good job of describing the two approaches to learning from a theoretical standpoint as well as how the approaches are used in agricultural settings. Perhaps this paper will provide a basis for those who want to understand more about the processes used in teaching and learning in a student-centered format.

However, I wonder about these approaches, that appear to be approaches to teaching with less structure, being too structured in their design. According to this paper, problem-based learning must occur in groups. Why? Is independent problem solving impossible? Are there no situations in which we could propose a real-life problem to a student in which the student must arrive at an answer by themselves – without assistance of others? While it may be desirable from the social interactions students develop within groups to use small groups to work on these problems, it is absolutely necessary? I would hope not, because in real-life settings, our students may have to work independently to solve problems they are facing in the agricultural world. One of the concerns surrounding problem solving instruction has been the process that seems to be so "lock-step." Why must it be so? Once a problem is presented to a student, is there not more than one way to collect information related to the problem solution? Why would we propose that it has to be through a group process? Granted, there is nothing wrong with a group process. My concern is that we don't lock ourselves into one teaching tool for every situation. The authors propose that problem-based learning and inquiry-learning strategies are non-linear, but we seem to provide a linear model for using these strategies.

This paper does provide good information for the reader regarding two student-centered teaching approaches – the background and theory related to these approaches and the differences between the two approaches. We will benefit from understanding the basic concepts regarding problem-based learning and inquiry learning. Perhaps we need to do more as a profession than to reflect on how we can use these problem-based strategies. We may need additional research that demonstrates the effectiveness of these strategies related to student achievement or retention of information.

Influence Of Creative Problem-Solving Upon Ninth Grade Student Achievement And Satisfaction

A Critique by
Jim Flowers, North Carolina State University

Student-centered approaches to teaching such as problem solving or inquiry learning have long been embraced in agricultural education. This research that examines the effectiveness of creative problem solving approaches addresses a needed area of research in the profession. The introduction adequately conceptualizes the study and provides a logical basis for examining the two levels of cognitive skills and the attitudes held by students with regard to these approaches.

The authors followed appropriate research methodology in designing this experimental study. It is obvious that a great deal of care was used in constructing the instruments used to measure student achievement. Appropriate procedures were used to insure content validity of the instruments and internal consistency as the measure of reliability. The authors were also very careful to prepare the teacher to use the creative problem solving approach in their classroom and to observe the teacher to validate that the appropriate procedures were used.

This research could be strengthened by increasing the sample size in the two groups. Due to the small sample size, it is very difficult to find differences, even if they may exist because of the low degrees of freedom in the statistical tests used. With only 10 students per group, the researchers would have had to have found very large differences in mean scores in order for the differences to be statistically significant. Students were randomly assigned to the treatment and control groups (which is unusual for school systems to allow random assignment of students to classes). Random assignment supposedly controls for pre-existing differences in normal population distributions, but NOT for very small groups such as these. There remains a good possibility that pre-existing differences existed between the two groups. In fact, the researchers reported that the standardized 8th grade test scores and the GPA's for the treatment group were lower than those in the control group. If this was the case, why didn't the researchers use these variables as covariates and adjust the mean scores based upon the pre-existing differences? By ignoring pre-existing differences in the groups, the researchers did not give the treatment group an equal chance to demonstrate achievement. Given that the authors did not use covariates, one has to also wonder what the rationale was for using ANOVA instead of a t-test?

Authors need to be very careful in the language used to describe the data when significance tests show no differences between the groups. If there is no statistical difference between the mean scores, the results could have occurred by chance. Therefore, it is NOT correct to describe the mean score for one group as higher or lower than another. Also, the effect size for differences between groups that are not significantly different has no meaning, yet one of the effect sizes was described as moderate.

The research does add to the body of literature related to inquiry or student-centered approaches. It is through repetition, not proportional sampling, that we are able to generalize from experimental research. So the more research that we have that provides consistent results, the more we will be able to understand the influence of inquiry approaches on student achievement or attitude.

Agriculture Teacher Perceptions Of Preparation To Integrate Science
And Their Current Use Of Inquiry Based Learning
A Critique by
Jim Flowers, North Carolina State University

The authors of this paper did an excellent job of documenting the need to integrate science into agricultural education courses, especially from the standpoint of national education reform movements. There was less attention provided in the introduction on the need to use inquiry learning techniques in agricultural education. But the overall result was a good conceptual basis for the purpose of the study.

In general, the methodology was sound. While the response rate was low, the researchers followed appropriate procedures for controlling nonresponse error. The authors seemed to pay close attention to the instrumentation used and followed appropriate procedures to address the validity and reliability of the instrument. Since the study was a census study, the readers were appropriately cautioned not to generalize beyond the population studied.

The results from this study provided some interesting points to consider. Less than half of the respondents' undergraduate major was agricultural education. I suppose this is not unusual in many of our states with the shortage of teachers who are prepared in traditional teacher education programs. These teachers somehow developed, as they perceived, adequate competence in integrating science into agricultural education. It was interesting that most of those teachers felt the answer was to increase instruction on integrating science into agricultural education curricula in the preservice agricultural education program, when less than half of them completed an agricultural education program. Where will the others who did not come through agricultural education programs receive this instruction? One might question whether this is a preservice or an inservice issue?

What was not measured in this study was the current level of science integration in the agricultural education courses taught by the respondents. This makes the results from Objective 2 much more obscure. The authors report that approximately 75% of the teachers plan to increase the level of science integration in their courses – but we don't know where they are now. Conversely, almost 25% do not plan to change their current levels of science integration. Perhaps they are already doing as much as they should!

Perhaps we also need some baseline levels for the amount of inquiry learning activities that agricultural education teachers SHOULD include in their classes. Perhaps the discussion section of this paper would be a good place to discuss whether 3 inquiry learning activities a week are enough. There is also a wide range of activities that could be classified as inquiry learning activities.

This study does provide us with information on the teachers' confidence in teaching science concepts in agriculture courses, and perhaps we also know that the amount of science taught in agriculture courses is likely to increase. As such, it is a good starting point for research in this area.

Research Posters

Student Attitudes vs. Technology Barriers: Who Wins??? - *Sara Brierton & David Jones, North Carolina State University*

The Effectiveness of a Dynamic Interdisciplinary Food Safety Curriculum Targeted on Middle School Students in Tennessee – *Sarah Johnson & Carrie Fritz, University of Tennessee*

What Affects Changes in Middle School Students' STEM Interests and Beliefs? *Shannon H. Degenhart, Gary J. Wingenbach, Diana L. Mowen, James R. Lindner & Larry Johnson, Texas A&M University*

Enhancing Preservice Agriculture Teachers' Reflective Practice Using the Structured Field Experience – *Ann Marie De Lay, Shannon G. Washburn & Anna L. Ball, University of Florida*

Needs Assessment for the Virginia Farm Bureau Federation Young Farmers Program: Who are Young Agriculturist in Virginia – *Rose Bradshaw, Virginia Tech, Doug Stoughton, Virginia Farm Burea;, Rick Rudd, Virginia Tech*

Is a Sense of Community Important to Distance Students? – *Rene P. Miller, Texas Tech/Texas A&M, Kim E. Dooley, Texas A&M University; David L. Doerfert, Texas Tech University; Theresa Pesl Murphrey, Texas A&M University; Scott H. Burris, Texas Tech University; Larry M. Dooley, Texas A&M University*

A Demographic Analysis of FFA Members' Chapter Leadership Engagement – *Brittany Wilkinson, Cameron White & Robin Peiter Horstmeier, University of Kentucky*

Keep the "Science" in Agriscience: The Importance of Science Integration into Agricultural Education – *Tiffany L. Johnston & T. Grady Roberts, Texas A&M University*

A Summation of the Preparation Level of First and Second Year Kentucky Agricultural Education Teachers – *Robin Peiter Horstmeier, University of Kentucky; Stacy K. Vincent, Murray State University; Amber Houck, University of Kentucky; Jay Morgan, Murray State University*

Factors Likely to Create Safety-Conscious Equestrians in the 4-H Horse Program – *Courtney Hathaway & John Rayfield, North Carolina State University*

The Effects of Reading Strategies upon Student Achievement Through the Content Area of Agricultural Education – *J. Chris Wilder, Williston High School; Anna J. Warner & Brian E. Myers, University of Florida*

Strategies Used by Agricultural Science Teachers to Serve Secondary Students with Disabilities – *Bob Williams, Texas A&M University Commerce; Terri Phillips, Corsicana Independent School District; Misty Lair & Erin Wilson, Texas A&M University Commerce*

Codifying the Wisdom of Expert Teacher Practice in Agriscience Fair Projects – *Brian Myers & Anna L. Ball, University of Florida*

Who is Living Where: An Assessment of Students Volunteering to Live in a Residential Learning Community or other On-Campus Resident Housing – *Steelee Hogue & Todd Brashears, Texas Tech University*

Extension Education within the Land-Grant University System – *Matt Benge, Diane Mashburn & Amy Harder, University of Florida*

Providing a Safer Consumer Product: Will Beef Cattle Producers Take the Next Step – *Laura Lemons & Todd Brashears, Texas Tech*

Seven Years of Stakeholder Evaluation Trends Regarding Experiential Learning – *Sarah Baughman, Barry A. Garst & Nicholas E. Fuhrman, Virginia Tech*

An Assessment of Minor Crop Producers' Extension and Education Needs – *Tanya C. Franke, Kathleen D. Kelsey & Tom Royer, Oklahoma State University*

Understanding the Strengths of our Future Agricultural Leaders – *Eric K. Kaufman & Thomas W. Broyles, Virginia Tech*

Student Teacher Data Collection Yields Positive Results – *John Ricketts & Jason Peake, University of Georgia*

Assessing the Employability Skills of Graduates in Hard vs. Soft Disciplines in a College of Agriculture – *J. Shane Robinson, Oklahoma State University*

Experiences of First Year Agricultural Education Teachers – *Robin Peiter Horstmeier, Cameron C. White & Amber M. Houck, University of Kentucky*

Experiences Agricultural Education Student Teacher Interns – *Amber M. Houck, Cameron C. White & Robin Peiter Horstmeier, University of Kentucky*

Gender Differences Among Agricultural Education Instructors' Attitudes Toward Information Technology – *Ryan Anderson, Murray State University; Rusty Miller, North Carolina A&T; Bob Williams, Texas A&M Commerce; Marshall Swafford, Moore High School; Kristy Brooks, Stony Point High School*

Implications of Maintenance and Motivator Factors on Extension Agent Turnover – *Robert Strong & Amy Harder, University of Florida*

Innovative Posters

Health Rocks! as a Leadership Tool – *Shanna Holder, Landon Summers, Jacquelyn Deeds & Susan Holder, Mississippi State University*

Future Agricultural Education Teacher Academy – *Jon W. Ramsey & Karie M. Smith, Oklahoma State University*

The Use of Action Research in a Reformed Pre-service Teacher Preparation Program – *Thomas W. Broyles, Rachel M. Morgante-Richmeier & Edward W. McCann Jr., Virginia Tech*

Developing a Comprehensive Recruiting Program: The Top Ten Things Deans / Department Chairs Should Know About Recruitment – *Lucas Dee Maxwell, University of Florida*

Save the Water! A Master Gardener Musical-Comedy with a Message – *Pat Grace, Virginia Tech*

Professional Development for Tractor and Machinery Certification – *Robert L. Williams Erin Wilson & Misty Lair, Texas A&M Commerce*

Program Evaluation and Development in Agricultural Leadership for FFA Officers – *John Lindsey, Worth County High School; Jamie Stevens, Lee County High Middle School; Dennis Duncan & John C. Ricketts, University of Georgia*

Internet Educational Games: Teaching Agriculture in the Digital World – *John C. Ricketts, Dennis Duncan & Frank Flanders, University of Georgia*

AgTube: Using Video Clips as a Pedagogical Tool to Teach Agriculture – *Dennis Duncan, John C. Ricketts & Frank Flanders, University of Georgia*

Student Success Workshop Series: A Student Retention Strategy Facilitated Through University Collaboration - *Amanda Lee, Barbara M. Kirby, Angel Johnson & Alease Hancock, North Carolina State University*

Reel me in! Using Movies to Reinforce Foundations in Teaching and Learning – *Amber M. Houck, Cameron C. While, Derek J. Smith & Robin Peiter Horstmeier, University of Kentucky*

The Big City, Big County Road Show Recruitment Model – *Lacee Brianne Fraze, Texas A&M University*

Documenting Accommodations for Special Needs Students in Agricultural Education – *Dana Melvin & Elizabeth Wilson, North Carolina State University*

The Importance of Sharing – A Web-Based National Database for Agricultural Education Lesson Plans – *Jason Peake & John Ricketts, University of Georgia*

Assisting Georgia Agriculture Teachers with Technology Integration – *Jason Peake, University of Georgia; James D. Scott, Coffee County High School*

Arkansas Biodiesel Research, Demonstration, and Education Project – *Garris T. Hudson, Donald M. Johnson & George W. Wardlow, University of Arkansas*

Computer Simulation of Statistical Concepts: A Visual Method for Enhancing Student Learning – *Donald M. Johnson, University of Arkansas*

LEI: Leadership Education Institute for Faculty in Colleges of Agriculture – *Penny Pennington Weeks, Jennifer Williams, William Weeks, Jay Barbuto, Cindy Blackwell, Christine Langone & Carol McBryde, Oklahoma State University*

Freshman College Orientation Courses in Agriculture: Enhancing Student Engagement – *Joey E. Mehlhorn & James N. Butler, University of Tennessee at Martin*

Using Movies to Teach – *David Jones, North Carolina State University*

Utilizing a Tablet Computer to Capture Evidence for Performance Based Assessment – *Richard Steffen, Illinois State University*

eLearning as a Tool for Faculty-Development Prior to Delivering Learner-Centered Workshops in International Settings – *Andrew C. Thoron, University of Florida; T. Grady Roberts, Texas A&M University; R. Kirby Barrick, University of Florida; Mohamed M. Samy, , MUCIA-AERI Linkage Project*

Increasing Multicultural Diversity through Educational Partnerships – *Doug Morrish, Texas State University San Marcos; Nora Garza, Laredo Community College; Aditi Angirasa, Texas State University San Marcos*

An 1862–1890 Partnership to Deliver Agricultural Education - *T. Grady Roberts, Texas A&M University; Wash A. Jones, Prairie View A&M University; Gary E. Briers, Scott R. Cummings, Kim E. Dooley & Chanda Elbert, Texas A&M University; Richard W. Griffin, Prairie View A&M University; Julie F. Harlin, Alvin Larke, Jr., Landry Lockett, Theresa Pesl Murphrey, Tim H. Murphy, Don L. Renchie & Christine D. Townsend, Texas A&M University*

Student Attitudes vs. Technology Barriers: Who Wins???

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Introduction/Need for Research

Technology integration into education is no longer a someday proposition, the question isn't if, it isn't even when, the question is how? How do we successfully utilize the power of new technologies to increase student learning, especially for those students who were not born with an iPod in their hands. How do we run with the latest and greatest integration methods when some of our students cannot even walk with yesterday's computer skill set? The assumption that our students, all of our students, are computer savvy is a dangerous one. Many of our students

may not have had the computer exposure we assume they have had, either because of location or upbringing, but especially because of age. And we are seeing more and more of these non-traditional students on our college campuses. Over the last three decades the rise of adult student participants in undergraduate classes has been significant (Seftor and Turner, 2002). If these students are not as proficient in using the computer as other students in their classes does this affect their thoughts about technology integration into those classes? This research looks to examine the relationship between computer skill proficiency and beliefs about technology integration into education.

Conceptual or Theoretical Framework

This research is based on Ajzen's (2001) theory of planned behavior (TPB). The theory of planned behavior says that people act according to their intentions (which are impacted by their behavioral attitudes) and their perceived control over their behavior.

Methodology

A survey instrument was used to collect data; it was administered to all students from two sections of an undergraduate level leadership course that is taught within a technology framework. The survey consisted of three main sections: computer skills which assessed general computer skills in several areas, a technology beliefs section which examined student's beliefs with regard to technology integration and classroom instruction on a Likert-type scale, and the barriers section, which also used a Likert-type scale with regard to the barriers of technology integration into education. The Cronbach's Alpha reported for each section was .95, .86, and .78 respectively (Brinkerhoff 2001). A brief introductory demographic section was used to acquire data regarding the age range of the participants.

Results/findings

The results of the study found that as age increases self-ascribed computer skill competency decreases. The survey consisted of 37 questions regarding computer skills, the statistical analysis returned ranged from low to substantial correlations (in the negative). The study also found that as age increases learners express that the barriers to integrating technology into education also increase.

Figure 1. Correlations between Age and Responses Regarding Technology Barriers.

Technology Barrier Question	#57	#58	#59	#60	#61	#62	#63	#64	#65	#66	#67
Pearson Correlation With Age	.587**	.583**	.451*	.337	.509**	.107	.550**	.255	.158	.243	.232

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed)

Analysis of the data found no such connection between age and beliefs. An increase in age appears to have no significant impact on the learner's beliefs about integrating technology into education.

Conclusions

Despite the fact that their skill competencies are not strong and the barriers to technology integration appear to increase with age these learners indicated that those factors had no significant bearing on their beliefs about integrating technology into education. The questions in the beliefs section were written to assess the learner's beliefs about this integration and its impact on them personally. It would be easy to agree that the integration of technology into education is a good idea in general; however these students support it for themselves specifically, even when their general computer skills are relatively weak and even though they are currently encountering integration barriers. These students believe that technology integration into education is important, that it will benefit them and increase their learning.

Implications/Recommendations/Impact on Profession

Although this study can serve as another endorsement for the continued integration of technology into education it is just as important that opportunities for improvement are recognized. Further research is needed on the best ways to integrate technology; ways that take into account the different skill levels of learners; ways that make the addition of technology a positive and not another barrier for students. Although these students have not been dissuaded in their beliefs despite barriers it is important to try and reduce those barriers and increase their skills. It is important to be careful when making assumptions about the computer skill set learners posses. It is also important that other assumptions are not made regarding older learners, such as that they are not interested or willing to participate in technology integration. Further research is also needed to indicate the best ways to provide opportunities for all learners to improve skills and reduce barriers.

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The Effectiveness of a Dynamic Interdisciplinary Food Safety Curriculum Targeted on Middle School Students in Tennessee

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Introduction/Need for Research: According to U.S. Center for Disease Control (as cited in Guinan et al., 2002) the number of lost school days annually among kindergarten through twelfth-grade students was reported to be 164 million days, with an average of 4.5 days a year per student. Research has shown that the earlier a person learns food safety the healthier they will be. Patnoad & Pivarnik (as cited in Eves et al., 2006) noted the importance of intervening early, before adulthood, as behaviors are more easily changed at a young age. Input at key stage 3 (11-14 years), may intervene before poor habits are established by providing direction as behaviors are learned for the first time, as well as providing an environment where young people can influence and be influenced by peers, (as cited in Eves et al., 2006). Children might also act as facilitators of good hygiene practices in the home through messages conveyed to family members. Dr. Richard Raymond, Under Secretary for Food Safety, said "We are protecting public health through a safer food supply, and I know we can make further progress in fighting foodborne illness" (Payne, 2006, p. 17).

Youth are in the category labeled "high risk," by the Center for Disease Control (CDC), because they are more likely to acquire foodborne illness and suffer more serious complications than adults (Food Safety Education Conference, 2006). The key to reducing foodborne illness is to educate children, especially the young, who are the food preparers of the future (Haapala & Probart, 2004, p.71). To address this need, a National Integrated Food Safety Initiative (NIFSI) Grant was awarded to a Southern state. The Food Safety in the Classroom curriculum was developed and implemented in two of the six schools in a county in the Southern state.

The Food Safety in the Classroom curriculum is an innovative curriculum designed to deliver food safety education through hands-on activities with real world applications. These food safety lessons meet the Southern state's performance standards and are taught in science, language arts, math and social studies, lasting one week. Each class lesson is coordinated with the other classes and each day builds upon the previous.

Conceptual or Theoretical Framework: With more than 144 million missed school days per year due to sickness, it is easy to see how crucial it is to control absenteeism (Guinan, McGuckin & Ali, 2002). Absenteeism defined is the number of episodes of illness per child per month (Guinan et al., 2002). Proper hand hygiene is the most effective way to stop the spread of illness-causing germs (Guinan et al., 2002). When students and teachers are absent from school they have lost learning opportunities, school funding is reduced and increased costs for substitute teachers.

Methodology: The overall purpose of this study was to assess the effectiveness of the Food Safety in the Classroom Curriculum with regard to its ability to increase 7th grade students' knowledge in science, language arts, math and social studies core courses, as well as their knowledge of proper food handling skills and behaviors. A descriptive research design that provided quantitative data was employed using ex post facto research. Pre-post tests were used

as well as post-test comparison. The study was conducted in the individual school classrooms, as to not disturb their learning environment.

The study used Non-Probability sampling, as the intended purpose was not to generalize to the entire United States population, but to use the findings to compare schools of the actual sample group being studied. This research used convenience sampling as the researcher simply chose the closest persons or intact groups, such as school classes. The population for this study included all 7th grade students at Burchfield, Huntsville, Fairview and Oneida Middle School. Each student was given equal opportunity to voluntarily participate in the study. The population consisted of 239 students; 145 for the treatment schools and 94 for the comparison schools, was generated from the school attendance database in the superintendent's central office.

Results/Findings: One of the objectives of this study sought to describe the differences in pre-test and post-test scores on all six dependent variables studied for the treatment group (Science Knowledge, Language Arts Knowledge, Math Knowledge, Social Studies Knowledge, Food Handling Skills Knowledge and Food Handling Behaviors Knowledge). There was a mean increase of 1.94 per knowledge area, which caused an overall mean score increase of 7.77 within these four knowledge areas comparing pre-test (M= 21.90) to post-test scores (M= 29.67). The overall mean score, including the knowledge areas, food handling skills and behaviors, for the pre-test totaled 60.01 and 72.56 for the post-test. Overall the treatment groups' mean score improved (12.55) from pre to post-test. Another objective for this study sought to describe the difference in post-test scores and follow-up test scores on all six dependent variables for the treatment group (Science Knowledge, Language Arts Knowledge, Math Knowledge, Social Studies Knowledge, Food Handling Skills Knowledge and Food Handling Behaviors Knowledge). The overall mean score for the treatment group follow-up (71.18) was higher than the treatment group post-test (69.84). Overall, the mean score for the post-test and follow-up increased by 1.34. The last objective sought to describe the difference in post-test scores for the treatment and comparison groups on all six dependent variables (Science Knowledge, Language Arts Knowledge, Math Knowledge, Social Studies Knowledge, Food Handling Skills Knowledge and Food Handling Behaviors Knowledge). The overall mean score for the post-test of the treatment group totaled 69.80 compared to 52.52 for the comparison group, an increase of 17.28. So, overall the treatment group scored higher on all components tested than the comparison group.

Conclusions: The following conclusions were based on the findings of this study:
The treatment group increased in all areas from pre-test to post-test. The areas included: Science Knowledge, Language Arts Knowledge, Math Knowledge, Social Studies Knowledge, Food Handling Skills Knowledge and Food Handling Behaviors Knowledge.
The data suggests this interdisciplinary food safety curriculum has made a positive impact on the treatment group. The scores after the program record higher overall than the comparison group scores. The data has shown the treatment group had retained the knowledge, skills and behaviors six weeks after the treatment was administered. Data revealed that the overall mean score for the treatment group pre-test was higher (+7.24) than the post-test score of the comparison group. There was some evidence to suggest that the treatment group had more knowledge than the comparison group before the treatment, except in science, however the gain score afterwards shows the program successful.

Implications/Recommendations: It would be of interest to conduct a study to compare this interdisciplinary food safety curriculum to another food safety curriculum with similar topics which is implemented in a single subject classroom instead of across all subject lines. The findings would further support whether students learn and retain more information if it is taught across all disciplines or in just one subject class.

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What Affects Changes in Middle School Students' STEM Interests and Beliefs?

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Introduction

Students' negative attitudes toward math and science and the "disconnect" they experience between scientific content and real-world applications increase as students advance in grade level (Morell & Ledermann, 1998; Weinburgh, 2003). By middle school many students do not connect classroom content with science-related careers: a time when the development of negative attitudes is most noticeable and critical changes have life-long affects (Anderman & Maehr, 1994; Atwater, Wiggins, & Gardner, 1995). This is of special concern as STEM attitudes affect career choices (Atwater et al., 1995) and STEM-based agricultural programs have experienced decreasing enrollment (McCallister, Lee, & Mason, 2005).

In an effort to increase middle school students' Science, Technology, Engineering, and Mathematics (STEM) attitudes and increase the connection of STEM content and real-world applications, The Partnership for Environmental Education and Rural Health (PEER) GK-12 program was developed at Texas A&M University. PEER was an interdisciplinary program funded by a grant from the National Science Foundation which utilized an interdisciplinary partnership between different STEM colleges and departments within the Texas A&M University system and public middle school math and science teachers and their students within a 40 mile radius of College Station, Texas. PEER placed STEM graduate students (termed NSF Fellows) in middle school science and mathematics classrooms to promote and create authentic inquiry lessons and serve as both teacher content resources and student role models. The goals of the project were to enhance the quality of middle school student educational experiences using inquiry learning and to improve middle school student's attitudes toward the STEM areas.

Methodology

The purpose of this study was to develop a model which describes the relationship of inquiry-based teaching elements on middle school students' STEM interests and belief changes. The study utilized pretest/posttest, correlational, and longitudinal designs and a voluntary population. Inquiry data and middle school attitudinal data were collected from middle school classrooms within a 40-mile radius of Texas A&M University during the 2004-2005 and 2005-2006 school-years. Classroom inquiry data were collected using the Reformed Teaching Observation Protocol (RTOP) developed by the Arizona Collaborative for Excellence in the Preparation of Teachers (ACEPT) at Arizona State University (Sawada et al., 2002). Middle school students' STEM interests and beliefs data were collected utilizing a pre-test/post-test design. The attitudinal instrument consisted of open-ended responses and Likert-scaled questions measuring middle school students' level of agreement (1= disagree strongly, 2= disagree, 3= neither agree nor disagree, 4= agree, and 5= agree strongly) with 20 reverse coded statements. STEM interests and beliefs scales were summed to determine middle school students' overall STEM interests and beliefs. RTOP scores and summed STEM interests and beliefs scales were converted to *z* scores and averaged so that Pearson's Product Moment Correlation analyses could be conducted to determine if statistically significant ($\alpha = 0.05$) relationships existed between classroom inquiry statements, demographic variables, and changes in middle school students' STEM beliefs and

interests. Stepwise regression analyses were conducted with RTOP statements and variables identified as having a statistically significant association with middle school students' STEM beliefs and interests.

Results

Data were analyzed from 139 RTOP observations (N = 139) and 1,779 middle school students' attitudinal data (N = 1779). Correlation analyses indicated the variable *change in STEM interest* had a statistically significant ($\alpha = 0.05$) relationship with middle school students' change in STEM beliefs and statistically significant ($\alpha = 0.05$) relationships existed between changes in middle school students' STEM interests and four RTOP inquiry statements: *"Teacher as listener" was very characteristic of this classroom; Students were involved in the communication of their ideas to others using a variety of means and media; Student questions and comments often determine the focus and direction of classroom discourse;* and *The instructional strategies and activities respected students' prior knowledge and the preconceptions inherent therein*." Regression analyses indicated 24% of the variation in middle school students' change in STEM interest was explained by the inquiry statement *"Teacher as listener" was very characteristic of this classroom.* Analyses further indicated that 55% of the variation in middle school students' change in STEM beliefs was explained by their change in STEM interests.

Conclusions and Recommendations

Middle school students' interest in STEM has a substantial affect on their beliefs about STEM and is significantly impacted by "teacher as listener" in the classroom. The relationship between STEM interests and STEM beliefs takes on greater importance as STEM attitudes affect career choice (Atwater et al., 1995), and increases in STEM beliefs should increase students' interest and pursuit of STEM careers. Instructional strategies emphasizing "Teacher as listener" should be implemented to increase middle school students' STEM interests, thereby increasing their STEM beliefs. Further research should be conducted as to why "*Teacher as listener being very characteristic of this classroom"* had such an impact on middle school students' change in STEM interests.

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Enhancing Preservice Agriculture Teachers' Reflective Practice using the Structured Field Experience

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Introduction

Teachers develop as professionals when they increase their understanding about their practice. Often, this level of awareness is gained through reflection. Reflective teachers dissect their current actions, express the rationale for using different techniques, then use the information to decide how to improve their efforts to maximize student learning (Lee, 2005). Attention to "pedagogical content knowledge; knowledge of characteristics of learners; knowledge of teaching contexts; and knowledge of educational purposes, ends and aims" (Walkington, Christensen, and Kock, 2001, p. 346) is the landscape from which teachers may draw for the purposes of reflection. However, teachers at all stages of their careers are different and as a result need access to differentiated opportunities to engage in the action (Nolan & Hoover, 2005).

Reflection is a highly personal activity and reflection affords teachers the opportunity to focus their efforts on their own challenges, what they want to know and learn more about, and the manner by which they wish to overcome those challenges. Preservice teachers have a limited concept of the teaching learning process when compared to practicing teachers. By supporting preservice teachers' reflective practice, they will be better prepared to facilitate their own professional growth needs once they depart the teacher education program.

Theoretical/ Conceptual Framework

In her study of preservice teachers' reflection, Lee (2005) used three criteria to assess the depth to which preservice mathematics teachers engaged in reflective practice. These levels included:
(1) Recall – describing experiences as they occur; failing to think of alternatives
(2) Rationalization – making connections between experiences; creating rules for future
(3) Reflectivity – viewing experiences from many perspectives; improvement being the goal

The study was founded on a constructivist theoretical perspective, relying on the participants' descriptions of their experiences to produce meaning. The purpose of this study was to examine how the structured field experience program impacts the level at which a preservice teacher reflects on his or her practice. Focusing on the content and depth of reflective practice, the following research questions were pursued: (1) on which topics did the participants spend the greatest time reflecting, (2) what changes in the participants' reflective practice occurred over the course of the four microteaching experiences and (3) what levels of reflection were reached by the participants?

Methodology

Nine members of the teaching methods course agreed to take part in this census study. Data were collected in the form of semi-structured interviews, the researcher's observation notes during the microteachings and during the interviews, and written reflections and lesson plans collected from the participants. As part of the course requirements, participants completed a

series of four microteaching experiences. Each field experience had associated activities including a pre-conference interview, a private written reflection, and a post-conference interview.

All observation notes were expanded and subjected to the coding process. Data were open coded using *in vivio* codes as appropriate. The open codes formed axial codes and the axial codes which were grouped into selective codes. Related selective codes were combined forming the overarching thematic domains.

Findings

The domains emerged from each microteaching, following a preliminary analysis of the data. Each domain is featured in bold text.

- Microteaching 1: Teachers were concerned primarily with **presentation style**.
- Microteaching 2: Teachers use of "I" was prevalent in a **teacher-first attitude**. **Classroom management** also surfaced as teachers spent more time considering student behavior in the learning environment.
- Microteaching 3: Teachers displayed a **Student-first attitude** with greater frequency and greater intensity. They also began to share more about the rationale behind their decisions.
- Microteaching 4: Teachers focused their reflections around assessing the current experience and **planning for change**.

Conclusions/ Implications/ Recommendations/ Impact on Profession

The preservice teachers engaged in each of the levels of reflection as the series of four microteachings proceeded. Much of the reflective statements in the early experiences were primarily related to the levels of Recall and Rationalization (Lee, 2005). Most of the teachers remained in these lower levels until their fourth experience, with several displaying tendencies toward higher levels of reflection as early as their second microteaching.

Many preservice teachers leave their teacher education programs lacking a solid understanding of the role reflection can play in their professional development. Continuous reflection can have a powerful impact on teachers' ability to perceive themselves and their roles as educators. The perceptions gained contribute to richer, more varied conceptions of self than can be expected from a program lacking such an activity. The use of pre-conferences, private written reflections, and post-conferences provide a forum for teachers to surface the thoughts, questions, and feelings they have about merging their theoretical knowledge within practical situations. By having access to a structured field experience during their teacher education programs, it is hoped preservice teachers can sustain higher levels of reflection following program completion.

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Needs Assessment for the Virginia Farm Bureau Federation Young Farmers Program: Who are Young Agriculturalists in Virginia

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Introduction

The agricultural industry is constantly changing. The industry has a constantly evolving assortment of occupations related to the production, processing, shipping, sales, and distribution of food and fiber products. Wildman and Torres (1999) describe this change from the traditional view of agriculture as, "the modern food and agricultural system encompasses not only primary production, processing, marketing, and retailing, but also natural resources and the environment; human communities and their well being; and consumer health, safety, and ethics" (as cited in Kunkel, Maw, & Skaggs, 1996, National Research Council, 1996). Other changes in the industry include the increasing average age of producers. The average age of Virginia producers is 56.7 years old (ERS, 2007), increasing the importance of a workforce of younger people interested in production, as well as other aspects of agriculture. However, Russell (1993) and others believe that "with fewer youth going into agriculture, the long-term future of the agricultural industry is in question." With these changes in the industry, come needed changes in agricultural organizations as they are vital in helping to prepare the future workforce of agriculture and sustaining rural communities.

The Virginia Farm Bureau Federation (VFBF) recognizes the need and importance of ensuring a bright future for agriculture and rural communities, embodied through mission statement "We will enhance, primarily through advocacy, education and communication, the agricultural interests of Farm Bureau members through economic, political and social programs" (VFBF, 2007). One of VFBF's largest programs, Young Farmers (YF), has traditionally been reserved for young producer members of Farm Bureau. The leaders of the Federation and YF Program have recognized the need to offer membership not only to producer members of VFBF, but to anyone interested in agriculture. The new definition states that "VFBF Young Farmers are those individuals 18 through 35 years of age with an interest in supporting agriculture through production, education, promotion and/or leadership" (Ron Saacke, personal communication August 30, 2007). By gaining a greater understanding of the characteristics of this group and examining and understanding the needs of young people interested in agriculture in Virginia, organizations like Farm Bureau can do a better job providing programs and support. Equipping this group with the tools necessary for success will help to ensure a bright future for all of Virginia's agricultural industry.

Conceptual Framework

Engelsgjerd and Larson (2000) determine that with the proper focus, methodology, and analysis, a needs assessment provides valuable information about what the current and potential members need, want, and expect. Utilizing this framework, the researchers developed a short needs assessment to determine who the potential YF member is and what they need to help them improve their careers, farms, or agribusinesses; their communities and organizations.

Methodology

This exploratory study utilized an electronic survey instrument to collect information on the organizational needs of young Virginian's interested in agriculture. This is a correlational study that utilized data from a census of the groups identified. The participants of this study were identified by the research team as having a vested interest in agriculture. The Virginia Association of Agricultural Educators, Cooperative Extension Agents, Farm Credit Lenders, and the current VFBF Young Farmers have been identified as groups whose members, by nature of the group, have a vested an interest in agriculture and or rural communities. The survey was pilot tested and modified to enhance face validity before it was administered. The response rate for the electronic survey was 22% (136 of 623).

Results to date

The results show that respondents have a vested interest in agriculture. While the majority works in an agriculture-related field other then farming, over half of the respondents plan to farm in the future. The majority of respondents are not the first generation to be involved in agriculture. All respondents reported that they are or have been a member of agricultural organizations including FFA, 4H, Farm Bureau, and commodity groups. Half of respondents are female and hold Bachelor degrees. Needed skills and programs identified by participants are grouped into two categories: those needed to improve their careers, farms, or agribusiness and their communities and organizations. If programs on the topics identified by the participants were offered their local area, the majority reported that they would attend.

Conclusions

Based on the responses received, the face of agriculture in Virginia is changing. While most of the respondents are at least the second-generation in their family involved in agriculture, more females are involved and many of respondents were interested in agriculture although they did not farm. The young agriculturalists surveyed also identified several areas where they would like professional development and they are willing to attend educational programs to improve their skills in leadership, management, and personal development.

Implications and Recommendations

The researchers recommend that a hard-mail survey be sent to ensure that voice of audiences not inclined to use electronic communications are included. Further research is necessary to further explore specific needs of the audience. The researchers who conducted this study are launching a qualitative study based on these findings.

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Is a Sense of Community Important to Distance Students?

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Introduction/Theoretical Framework

Agricultural Education departments are offering classes as well as full graduate degree programs online. This trend reflects Dawson's (2006) statement that higher education is changing from a teacher-centered to a learner-centered focus. Distance students are attracted to online learning because it is flexible and realistic. Resident and distance graduate students learn from observing and interacting with faculty, but it is important to recognize that they also have a strong reliance on their peers to make sense of their graduate school experiences (Austin, 2002). Vygotsky (1978) argues learning is not merely the accumulation of new knowledge, learning is a product of social interactions and learning is the process of learners being integrated into a knowledge community. As such, do distance students think a sense of community is important in helping them learn when separated from their peers?

Methodology

This study is classified as expansion research within the qualitative research paradigm using naturalistic inquiry, incorporating quantitative analysis that was descriptive and correlational. The natural setting for this study included all 19 students of the new cohort of a jointly administered distance delivered doctoral program. The cohort was introduced to the study and the use of a Wiki during their induction, August 2006. The following December, after the cohort had completed their first semester in the program, they each participated in a semi-structured phone interview assessing the cohort's experience as new online students, their use of web-based communication tools, and to asses their person sense of community with the group. The Sense of Community Index was administered during the phone interview. A tally was kept of each individual's use of the Wiki and the pages of the Wiki were printed for content analysis.

The constant comparative method of content analysis was used on collected data (postings from the Wiki and the transcribed interviews) to compare across categories and construct meaning. Descriptive frequencies, responses from the SCI, and bivariate correlations were analyzed using the Statistical Package for Social Sciences (SPSS), version 14.0.2, 2006.

Results

The Sense of Community Index (SCI) developed by Chavis, Hogge, McMillan, & Wandersman (1986) seeks to give a quantitative expression to a person's sense of community, which is usually defined as a sense or feeling that a person has when they feel a sense of trust, safety, and belonging with others in their community. All 19 participants in the cohort scored at least 75% *True* answers on the SCI and eight students scored 100% *True* answers. A true answer on the SCI indicated a strong feeling of community and a *false* answer indicates a weak feeling of community. The entire cohort quantitatively feels a strong sense of community. This finding is supported by the qualitative data as every member of the cohort responded that they felt they *fit in with the group* when questioned during the interview.

When asked during the interview if a social connection helps the student learn, 16 responded positively. The following are some of their responses: “I don’t think it is necessary, but I value it”, “I think it is important. Interaction with other people builds relationships”, “I would say that it is helpful and it depends on the individual. For me it is important”, “Yes, for me I think it is needed. I don’t want to feel like it is just one professor and me”, “I feel that we need an opportunity to bond with these people”, “I think we all need to help each other when we can. Nobody is going to be an expert in every subject”, “Absolutely!”

Three students responded briefly that they did not think that a social connection was important even though they individually selected at least 75% *True* answers (indicating a strong sense of community) to the statements of the SCI.

Conclusions

Learning as a community is important to this cohort of students even though they are scattered throughout the United States and Canada. The cohort met together as a group for their induction into their distance delivered doctoral program and they state that meeting face-to-face was instrumental in forming their sense of community. However, through the use of web-based communication tools their sense of community was able to flourish as the semester progressed. The cohort used a wiki, instant messenger, email, and web conferencing software to connect with each other on a routine basis.

Implications

Resident students can interact on a routine basis before and after class and in the hallways of their brick and mortar institution. Distance students do not have the ability to interact with each other without the use of some kind of communication assistance. It is critical for educators to encourage interaction among distance students and provide assistance in setting up communication channels to allow these students to build a sense of community among and with other learners. The results of this study concur with the literature as to the importance of a sense of community. The results of this study can be useful in the design of online delivered instruction programs.

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Demographic Analysis of FFA Members' Chapter Leadership Engagement

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Introduction/Need for Research

As a premier youth leadership organization, FFA has prepared future leaders through local, state and national activities. The FFA mission is: "The National FFA Organization is dedicated to making a positive difference in the lives of young people by developing their potential for *premier leadership*, *personal growth* and *career success* through agricultural education" (National FFA, 2005). Positive relationships exist between leadership skills and FFA participation (Wingenbach, & Kahler, 1997). FFA involvement has been shown to impact the success of community leaders regardless of their occupation (Brannon, Holley, & Key, 1989). FFA members were more engaged in school/community activities and career preparations than either non-members or typical high school students (Balshweid & Talbert, 2000).

Lofquist (1989) described the interaction between youth and adults in youth leadership organizations and identified that members are viewed as objects, recipients, resources, and partners. Ayers' (1987) identified four key developmental phases in which individuals engaged in a leadership curriculum should progress: self, interpersonal, groups, and community.

Conceptual or Theoretical Framework

The Theoretical Framework examines the role of members (Lofquist, 1989) and context of leadership activities (Ayers, 1987) as created by Peiter, Rennekamp, and Nall.

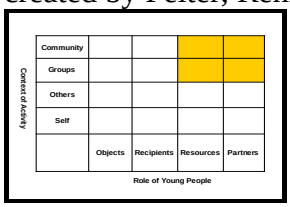

Figure 1. Conceptual Map for Theoretical Framework

Methodology

The purpose of this study is to describe chapter leadership experiences of rural FFA members participating in civic engagement activities. The objective is to describe the role of FFA members and context of leadership activities by gender, grade level, and chapter officer experience.

The population of this descriptive study was rural FFA members participating in civic engagement activities. The research developed an instrument based on the theoretical framework. Sixty-four questions were developed which reflect the context of leadership activities and member role in those activities. Demographic information was also attained. Respondents measured their chapter based on a four point Likert scale. Content and face validity of the instrument was established using a panel of experts in the field of leadership development, NAAE Board of Directors, agricultural education pre-service teachers, and former FFA members. The instrument was pilot tested with FFA members in a non-selected state.

Chronbach's Alpha: Objects (α = .71), Recipients (α = .85). Resources (α = .88), Partners (α = .86), Self (α = .72), Interpersonal (α = .88), Groups (α = .88), and Community (α = .88).

FFA chapters receiving National FFA Civic Engagement grants (*N* = 15) were selected for this study. Six hundred forty-six members in 12 chapters (75%) and responded. Research data were analyzed using SPSS 14.0 and descriptive statistics of frequencies, percentages, means, and standard deviations were reported for the two demographic areas.

Results/Findings

For member role, Partners was reported the highest from females (M=3.33) and males (M=3.13). Similarly, Recipients possessed the lowest mean score from females (M=3.10) and males (M=3.00). In terms of leadership through chapter activities, Self was reported the highest from females (M=3.34) and males (M=3.18), while Community was reported the lowest from females (M=3.10) and males (M=2.99). For member role, juniors reported the highest mean score as Partners (M=3.29), while the lowest was middle school as Recipients (M=2.96). For leadership activities, juniors reported the highest in terms of Self (M=3.32), while the lowest was seniors in Community (M=2.88). Students in FFA for 5 years reported member role as Partners (M=3.52) the highest while members in FFA for 6 years reported Objects (M=2.82) as lowest. For leadership activities, students with 5 years of FFA experience reported Self (M=3.46) as highest while students with 4 years of FFA reported the lowest in terms of Community (M=2.87).

Conclusions

Female members viewed each area for member role and context of activities greater than male members. Both female and male FFA members viewed partners as the greatest role in youth-adult relationships and self as the greatest context of leadership activities. Regarding grade level, Junior members viewed youth-adult partnerships greatest in three of the four areas, with partners identified the greatest. Leadership activities for Junior FFA members were greatest in three of four leadership areas, with self development the greatest. Members who served as a chapter officer believe their member role increases as they moved through the continuum, whereas context of leadership activities decreased.

Implications/Recommendations/ Impact on Profession

FFA chapters should continue to design activities that engage members as objects, recipients, resources, and partners in community based leadership activities; with the greatest emphasis on community partnership. Advisors must provide leadership in establishing meaningful chapter activities through a well developed Program of Activities (POA, as developed by the members). Further research must examine the FFA advisors' role in developing members' leadership skills through member role and context of leadership activities. In addition, the status of chapter planning through the POA must be examined.

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Keep the "Science" in Agriscience: The Importance of Science Integration into Agricultural Education

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Introduction & Theoretical Framework

In today's world of academic demands, educators are constantly searching for ways to improve their secondary students' standardized test scores. This problem is often compounded with higher graduation requirements set forth by state education agencies. Many states have already passed legislation calling for increased student achievement by setting higher curriculum, instruction, and accountability standards. Concurrently, public high school agricultural education classes are considerably changing their curricular structure in order to offset the significant drop in enrollment numbers (Hoover & Scanlon, 1991). Since the Hatch Act of 1887, science has played a role in agricultural education (Budke, 1991; Christian & Key, 1994; Hillison, 1996; True, 1929; Vaughn, 1993). Accordingly, the need for integrated lessons has never been greater.

Methodology

This study consisted of a content analysis of the *Journal of Agricultural Education* on articles that investigated science integration in to the agricultural classroom. The conclusions for each article were examined and then categorized. One research question guided this inquiry: who influences the successful integration of science in to an agricultural education program?

Results/Findings

Three groups that play a crucial role in the integration of science into agricultural science programs are: high school agricultural educators (Thompson & Balschweid, 1999), secondary level administrators (Thompson, 2001), and secondary level science teachers (Warnick, Thompson, & Gummer, 2004). First, collaboration between agricultural science teachers and colleagues at their schools as well as others will prove to be one of the most helpful tools in not only creating proper implementation plans, but continuing to raise the standards in the integration program. Second, principals often have substantial influence on the curriculum taught on their campus. With that being said, having the support of these administrators is vital to the integration of science into the agricultural science and technology programs. Anecdotal evidence suggests, when principals support and promote collaboration between all departments of a school it creates an environment of professional teamwork with the end result benefiting the student in the most positive way. Much of the focus should also be placed on the importance of support from school counselors. Although, limited research was found on the counselors' role in supporting integrating science in agricultural education classrooms, it would be unfair to say that counselors do not have a hand in the courses that high school students take during their academic career. Third, science teachers believed that agricultural classes are an applied science and that students enrolled in those courses will learn more when science concepts are integrated throughout the curriculum (Warnick et al.).

Conclusions

Based on the research consulted, it was concluded that integration of science in to agricultural education programs requires support from: (1) agricultural education teachers, (2) science teachers, and (3) school administrators. A model was created (Figure 1) to illustrate these conclusions.

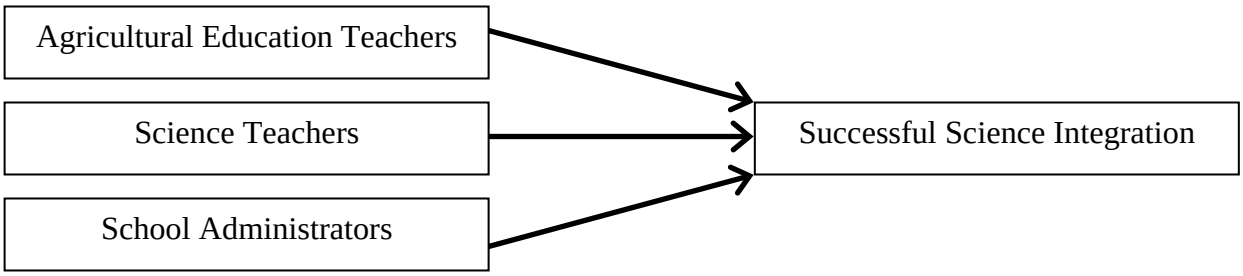

Figure 1. Model of support required for integration of science in to agricultural education.

Implications

What do we do now? It is obvious that we need to promote awareness of this opportunity. Beyond that, obtaining funding and equipment necessary to execute an efficient and successful curriculum would be a great start. Developing and offering workshops to prepare preservice and inservice teachers (both science and agricultural) in curriculum integration is necessary. As agricultural education teachers become properly prepared in ways to integrate science into their curriculum, it will become easier and integration will become second nature. Proper monitoring of the implemented integration would prove to be crucial for the effectiveness of the program and should be conducted by school administrators and university faculty..

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A Summation of the Preparation Level of First and Second Year Kentucky Agricultural Education Teachers

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Beginning Agricultural Education teachers face challenges in being knowledgeable in all facets of the agriculture and education industry. In addition to teaching an ever-changing subject matter in technical agriculture, additional responsibilities including advising members of a student organization, supervising student projects (also referred to as SAE), and managing the total Agricultural Education program (Peiter, Terry, and Cartmell, 2003; Ricketts, Duncan, Peake, & Uesseler, 2005). Melodia and Meyer (2001) identified that a well rounded prepared Agricultural Education teacher should be able to integrate the FFA and SAE components as natural extensions of the academic classroom.

Standardized examinations are utilized to assess what a pre-service Agricultural Education teacher should know. However, these tests provide little to no knowledge of the teacher's skill and competence level in regards to what the novice educator should be able to do.

Conceptual or Theoretical Framework

The theoretical framework for this study was the Herzberg's Motivation-Hygiene Theory. Herzberg conceptualized two components of motivation: 1) Hygiene (the job environment) and 2) motivation (what people actually do on the job). According to Herzberg, both hygiene and motivation occur at the same time. However, if beginning teachers are not adequately prepared for teaching, both the hygiene and motivator factors may prove to facilitate negative experiences in the classroom. This study seeks to identify how well beginning Agricultural Education teachers are prepared for their employment experiences.

Methodology

First and second year Agricultural Education teachers in a southern state served as the population for this study. Two years (2006 [n = 24] and 2007 [n = 23]) of first and second year teachers were used as the sample for the study. The data collection instrument (utilized and developed by the researchers) consisted of 41 statements seeking the perceived level of preparation, on a four-point Likert scale, in five Agricultural Education program areas: program management (6), FFA (5), SAE (4), technical agriculture (12), and classroom instruction (13). Beginning Agricultural

Education teachers had knowledge and/or experience for each statement, therefore asking each respondent to provide their perception. The response rate was 100% both years and data were analyzed using SPSS 10.0.

Results/findings

An increase of preparation level was made in four of the six areas evaluated in the program management areas. For the questions dealing with FFA, teachers believed they increased their level of preparation in four of the five areas: planning program of activities, preparing degree applications, planning conferences, and officer elections. Levels of preparation increased in three of the four SAE supervision areas. Three of the twelve areas of technical agriculture actually decreased from the evaluation once the teachers completed their first year. Those areas were Agronomy, Equine Science, and Agri-biology. On a positive note, teachers felt that their level of preparation had increased in nine of the eleven areas evaluated in classroom instruction.

Conclusions

In most areas, beginning teachers feel prepared to teach. Experienced teachers, finishing their first year of teaching Agricultural Education have a high level of perceived preparation than teachers currently entering the profession. Teachers feel most prepared to teach the Introduction in Agricultural Science or Animal Science courses. For most areas in technical agriculture, teachers believed that their efficacy level increased during their first year teaching Agricultural Education. Although, levels of preparation were high in most FFA areas, SAE supervision received mixed reviews depending upon the teacher.

Implications/recommendations/impact on profession

This research provides teacher educators of a southern state with an understanding of the preparatory practices needed within the profession and an opportunity to analyze our own curricula. It is our challenge to prepare pre-service Agricultural Education teachers for their first year teaching experience as well as the high demands of the ever-changing agriculture industry. Continued research is needed in evaluating the differences between preparation level at the start and end of the first year teaching experience. Additional research is needed in the correlation of efficacy levels in the teaching experience and the teacher's high school experience.

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Factors Likely to Create Safety-Conscious Equestrians in the 4-H Horse Program

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Introduction

Across the United States horseback riding is a popular activity for youth, many of whom participate in various activities within the 4-H Horse Program. The 4-H Horse Program is not limited just to horse owners, as it allows many youth who do not own a horse access to them through club activities and lease programs. Within 4-H and other youth horse activities such as the United States Pony Club, there is a push for all youth to wear helmets during mounted activities. In some states, it is mandatory that youth wear helmets during all mounted activities including horse shows, and in all states it is strongly encouraged. Substantial research has been conducted to determine the effects of wearing a helmet while mounted, attitudes toward helmets and how to foster helmet adoption. However, the area of ground safety has been neglected. According to the Children's Safety Network (2005), one in three equestrian-related injuries occurs while dismounted. It is imperative that more attention be diverted to this area. This study is an attempt to benchmark the current level of horse ground safety among participants in the North Carolina 4-H Horse Program.

Conceptual Framework

Experiential education, a concept that stems from the educational philosophy of John Dewey, is largely employed by 4-H. Dewey (1916) defined education as "that construction or reorganization of experience which adds to the meaning of experience and which increases the ability to direct the course of the future" (p. 76). According to Dewey and William James, experiential education is the most effective means for teaching youth practical knowledge (Boyd et al, 1992).

Methodology

In June 2007, 63 North Carolina 4-H Horsemanship Camp attendees participated in a mixed methods research project that focused on horse safety. Stakeholders in the North Carolina horse industry and the Cooperative Extension Service teamed up to conduct this study. The objective of this project was to determine if 4-H Horse Program participants possess the cognitive knowledge and psychomotor skills needed to remain safe while working around horses on the ground. Additionally, this project sought to determine whether factors such as taking riding lessons, owning a horse or competing in horse shows affected safety skills and awareness. Participating campers completed demographic information, a written test and a skills test. During the skills test, campers performed various tasks associated with working with a horse on the ground. The skills test was broken into three sections: stall safety, leading and grooming. Each camper's performance was observed and scored by a panel of trained horse industry experts.

Results

Sixty-three 4-H Horsemanship Camp attendees participated in the study, ranging in age from nine to 17. Of those, 65.5% have been involved in the 4-H Horse Program for three or less years. Approximately one-third stated that western is their primary riding discipline, and over

half mainly ride hunt seat. Horses are owned by 90.5% of participants or their families. The vast majority (84.1%) have taken riding lessons from a professional instructor at some point in their lives, and more than half (58.3%) currently take lessons. More than one-third have competed in 4-H horse shows.

Riding discipline was a determining factor in safety scores, as hunt seat riders posted higher mean scores than western riders in all three areas of the skills test. Previous lesson experience produced a negative correlation, but current lesson experience resulted in a positive correlation. Additionally, horse ownership did not translate into a higher safety score. Table 1 displays correlations between background factors and safety scores earned by camp participants.

Table 1
Background Factors Affecting Ground Safety Scores (N=63)

Factor	Leading *r*	Stall *r*	Grooming *r*
Which discipline do you ride primarily?	.206	.110	.212
Do you or your family own horses?	-.066	-.261	-.142
Have you ever taken riding lessons?	-.053	-.255	-.212
Do you currently take riding lessons?	.140	.085	-.024
Do you compete in 4-H horse shows?	-.036	.035	.106

Conclusion

Youth who participate in the 4-H Horse Program often spend countless hours in the saddle and interacting with horses on the ground. However, it takes more than horse exposure to develop a safety-conscious equestrian. Young riders need to receive regular training from experienced equestrians, such as lesson instructors, Extension specialists and 4-H club leaders. Additionally, more educational emphasis should be placed on ground safety knowledge and skills rather than assuming youth are only at risk when mounted.

Implications

The 4-H Horse Program has a responsibility to promote a safety-conscious environment. Safety in mounted activities, primarily through the use of a helmet, often receives the lion's share of attention, but it is necessary for Extension specialists, horse program volunteers and parents to take the initiative to educate youth on matters relating to ground safety.

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The Effects of Reading Strategies upon Student Achievement through the Content Area of Agricultural Education

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Introduction / Need for Research

The U.S. Department of Education (2003) reports in 2002 more than eight million students in grades 4-12 were struggling readers. For this reason and others, reading initiatives were endorsed such as the No Child Left Behind Act of 2001, enacted nationally, and the STATE adopted STATE Reading Initiative. The STATE Reading Initiative is a K-12 research based, school wide project committed to providing the training, knowledge and support necessary for schools to reach 100% literacy (NEFEC, 2001). Teachers in all content areas, including agricultural science, face mounting pressure to incorporate content area reading strategies (CARS) into their curriculum (Moje, 1996; Park & Osborne, 2006; Snow 2002). As Parks and Osborne (2006) imply, agriscience teachers have a responsibility to incorporate reading strategies into the curriculum because "all teachers are teachers of reading" (p. 47).

STATE Best Practices Center assembled six CARS known in the Levy School District as The Essential Six. The Essential Six were chosen by the NEFEC to consolidate the possible strategies into a smaller number of high yielding strategies which can be used by all teachers in any content area. The six strategies included in the Essential Six are: 1) Preview, Access and Set the purpose (PAS); 2) Question-Answer Relationship (QAR); 3) Summary Frames; 4) Concept Maps; 5) Column Notes; and 6) Reciprocal Teaching (NEFEC, 2001).

Conceptual Framework

Content area teachers, such as agricultural educators, are encouraged to infuse lessons with CARS to reach as many students as possible for several reasons. First, the use of CARS builds a foundation for the subject upon which the students and teachers can expand (Moje, 1996) Secondly, regardless of a person's age or skill level, he/she can learn new reading skills which will improve his/her overall skill (Snow, 2002). Finally, the interaction of the teacher with his/her students and the attitudes the teacher exhibits towards CARS strongly influence the students' acceptance of and success with CARS (Moje, 1996; Snow 2002)

Methodology

The population of this study was composed of two classes of high school agricultural students enrolled in Agriscience Foundation (N = 50). This study employed a quasi experimental design in which each class was randomly assigned to either treatment (n = 25) or control (n = 25) group. This nonrandomized control group and pre-test-post-test design allowed for the use of the Essential Six strategies to be evaluated in the acquisition of student knowledge on the subject matter.

A pre-test was administered to the class before instruction to establish a base line to measure content knowledge levels in the subject mater. The variable was used as a covariate measure in analysis. The treatment group received instruction of the lesson with the Essential Six strategies

infused throughout. The control group received instruction of the lesson without use the Essential Six strategies. At the end of the unit the post-test was administered.

Results / Findings

No significant difference was found between groups due to demographic variables of ethnicity, gender, state standardized test score, or participation in the school lunch program. The mean overall score out of 100 possible points on the pre-test was 36.58, with a range of 64 and a standard deviation of 15.51. The mean overall score out of 100 possible points on the post- test was 70.52. This administration of the instrument had a range of 60 and a standard deviation of 15.51.

When the two groups were compared the mean of the pre-test for the control group was 40.88 with a standard deviation of 17.44. The mean of the pre-test for the treatment group was 32.28 with a standard deviation of 12.18. In comparison the post-test mean for the control group was 72.72 with a standard deviation of 15.91. The post-test mean for the treatment group was 69.32 with a standard deviation of 15.10. Using the covariate of content knowledge pretest score, the effect of treatment was found to not be statistically significant, $F(1, 47) = 0.30$, $p = .59$. Therefore, the null hypothesis failed to be rejected.

Conclusions / Recommendations

The finding that the use of the Essential Six content area reading strategies neither aided nor harmed the students' content knowledge achievement is important to agricultural education. This investigation's findings show that CARS can be implemented in the agricultural education classroom without negatively impacting subject matter comprehension, thus providing the opportunity for the agricultural education courses to contribute in a positive way to the goals of the overall school community and still meet course goals.

Even with a strong methodological foundation, the sample size of the study limits the ability for generalizations of the findings. It does, however, suggest that further research into teaching strategies is needed for content teachers to be at their best. It is recommended that further research in this area of inquiry be completed in agricultural education as well as other areas of career and technical education. These future investigations should include larger sample sizes to aid in generalization of results.

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Strategies Used by Agricultural Science Teachers to Serve Secondary Students with Disabilities

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Introduction

The Individuals with Disabilities Education Act Amendments of 1997 (PL 105-77) require that students with disabilities have access to the general curriculum. The Carl D. Perkins Vocational and Applied Technology Act of 1990 (PL 101-392) mandated equal access to career and technical education for students from special populations, which include students with disabilities with more recent re-authorizations of Perkins increasing emphasis on special populations. According to the Texas Education Agency (2003) 90,109 students were enrolled statewide in agricultural sciences, accounting for 10% of the total secondary career and technical education enrollment. During the 2001-02 school year, students with disabilities accounted for 20.98% of enrollment in secondary agricultural sciences (Texas Education Agency, 2004a), while students with disabilities only accounted for 11.7% of the overall secondary (grades 7-12) enrollment (Texas Education Agency, 2004b).

Elbert and Baggett (2003) recommended additional training in teaching techniques for agricultural science teachers who taught students with disabilities. Administrators from Texas Educational Service Center Regions 8 and 10 ranked the skill *modifying instructional techniques for students with disabilities* ninth out of 49 total skills in which agricultural science teachers were expected to be competent (Taylor, 2001) indicating a high priority of importance for teacher preparation.

Methods

This is a descriptive study related to strategies that secondary agricultural science teachers use to serve students with disabilities. Direct-mail survey techniques prescribed by Salant and Dillman (1994) were used for data collection with strict adherence to the guidelines of the Institutional Review Board on Human Subjects. The study determined the effectiveness and frequency of use of each strategy, as perceived by the respondents. The population consisted of all secondary agricultural science ($N = 333$) within Texas Educational Service Center Regions 8 and 10. A researcher-developed direct-mail questionnaire was used to collect data from a randomly selected sample consisting of 2/3 of the population. Fifty nine (27.0%) agricultural science teachers responded. The questionnaire included a series of strategies collected from special education documents including Individualized Education Program, Individualized Transition Plans, and modification sheets provided to agricultural science teachers. Content analysis was used to identify 75 individual strategies that had been recommended for use by secondary agricultural science teachers. Each strategy statement was accompanied by a *Frequency of Use* scale and an *Effectiveness* scale. A reliability coefficient of .96 in the form of *Cronbach's* alpha for the 75-item *Effectiveness Scale* was found, thus confirming very reliable results. Data were analyzed for this presentation to answer the following research questions:

-What strategies for students with disabilities used by agricultural sciences teachers are perceived as most effective?

-How often are specific strategies for students with disabilities used by agricultural sciences teachers?

Results

Answers to the research questions will be reported in the poster in a *Top Ten* format, indicating the ten most frequently used strategies and the ten most effective strategies, as perceived by secondary agricultural sciences. Based on mean scores for all strategies, *giving oral directions* was the most often used strategy and *clearly defined limits* was the most effective strategy.

Conclusions

There are many strategies for serving students with disabilities recommended for use by secondary agricultural science teachers. Data analyzed and reported indicate that some strategies are perceived as being very effective and are used frequently.

Implications

Preservice and early career teachers should be introduced to the most effective strategies and encouraged to master the use of these in the inclusive setting. Further investigation of the relationship between the individual strategies and nature of the disabilities encountered within each teacher's classes should also be considered.

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Codifying the Wisdom of Expert Teacher Practice in Agriscience Fair Projects

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Introduction/Need for Research

As agricultural education builds upon its case that it provides scientific instruction through agriscience curricula it becomes important to bring scientific inquiry to the agriscience classrooms. Examination of work completed in science education becomes necessary to begin to develop learning of a science nature in agriscience classes. A report by the American Association for the Advancement of Science [AAAS] (1990) stressed scientific inquiry as the mode of instruction. The *National Science Education Standards* (National Academy of Science, 1996) also states inquiry based instruction key to successful science instruction. Agriscience fair-type projects may be a way to meet these goals.

The purpose of this investigation was to codify wisdom of teacher practice of expert agriscience teachers in agriscience fair project development and management. This research was guided by the following objectives:

1. Identify the characteristics of exemplary agriculture teachers in the area of agriscience fair project management.
2. Determine the problems of teaching practice in the development and management of agriscience fair projects experienced by expert teachers.
3. Explore the ways in which expert teachers reflect upon and solve the problems associated with the unique practice of developing and managing agriscience fair project programs.
4.

Conceptual/Theoretical Framework

The study was framed conceptually by Shulman's (2004) assertions regarding the wisdom of teacher practice. As such, the practice of effective practitioners should be codified to create grand theories of teacher practice for a broader audience of practitioners. The study was theoretically framed around the coded differences between expert and novices in regard to the schemas that they have adapted for identifying, analyzing, and subsequently approaching problems associated with their particular craft or profession. More specifically the notion of expert teacher thinking (Redish, 1996), illustrates that expert teachers have a different schema for the problems of teaching that they identify and the ways that they solve those problems, and they can think about how learners think most effectively. This study attempted to codify the wisdom of practice of expert agri-science teachers in regard to their approach to incorporating agriscience fairs projects within the total schema of student learning.

Methodology

This was a qualitative case-study investigation conducted through an interpretivist epistemological paradigm. The participants were purposively selected based upon expertise in agriscience fair participation. Expert teachers were determined based upon having the most individual student participants in national agriscience fair competition within the past five years. Eleven teachers across the nation participated in an hour long phone interview, a follow up reflection, and submitted agriscience fair materials for document analysis. All one-to-one interviews transcriptions were coded for emerging themes based on the research questions. Credibility, transferability, dependability, and confirmability were established through the use of peer debriefing, transcriptions of interviews, direct quotes, triangulation, thick description, and an audit trail (Donmoyer, 2001; Lincoln & Guba, 1985). All interview and reflection questions were constructed from a review of the literature for credibility.

Results/Findings

Six major themes (with sub-themes) emerged from the expert agriscience teachers:

1. Supervised Agricultural Experience (Agriscience based SAE programs and Agriscience supplements to "traditional" programs)
2. Partners (University faculty, other teachers (science, English, and math), and community members)
3. Motivation (Competition, reputation, and sense of purpose/success)
4. Curriculum (Agriscience focused curriculum and teaching methods)
5. Project Development (Project idea generation, multi-year projects, and management of projects)
6. Value of projects (Life skill development and public relations/support)

Conclusions

- Expert teachers conceptualized agriscience projects into three broad categories: how they manage them day to day, how they approach motivating students, and how the science fair fits into and enhances their program.
- Teachers saw agriscience as a competition others saw it as a vehicle for integrating science into all aspects of their teaching. Thus, their approach to agriscience impacted how they defined the agriscience fair as either driven by competition, or driven by opportunity to learn about science.
- Agriscience projects were a vehicle for teaching inquiry, as the entire program was based on problem-solving instruction framed by the science fair projects.
- Life skill and problem-solving/thinking skill development was a positive outcome of the agriscience projects.

Implications/Recommendations/ Impact on profession

Agriscience projects could be viewed as a modern manifestation of the traditional "three circle model" of agricultural education. The agriscience project was the intersection at which all three major components, Instruction, SAE, and FFA, met. A synergy was created by which each was more effective, more efficient, and more impactful through its interaction with the others.

This information should be shared with the leadership of current national agriscience curriculum projects. Agriscience fair-type projects should be included as a major component of this curriculum. Whereas, a lack of understanding of these types of projects by the general teacher population was noted, there is a need for professional development materials to be developed and shared with all teachers on how to implement the themes identified in this study on a larger scale. Furthermore, a quantitative study of these themes should be conducted to investigate their generalizability.

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Who is living where: An assessment of students volunteering to live in a residential learning community or other on-campus resident housing.

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Introduction

Learning communities are quickly becoming one of the most discussed topics on college campuses today. According to Lenning and Ebbers (1999), residential learning communities organize on-campus living arrangements so that students taking two or more common courses live in close physical proximity, which increases the opportunities for out-of-class interactions and supplementary learning opportunities. These communities have been shown to have a significant impact on student success. Studies have linked residential learning communities with greater social interaction, involvement, and higher graduation rates (Blimling, 1993; Pascarella, Terenzini & Blimling, 1994).

With the rise in interest and establishment of these communities it is important to analyze which students are drawn to them in order to determine recruitment strategies and community effectiveness. College recruitment strategies have become increasingly far reaching and for some, the learning community could prove to be a huge draw. The purpose of this poster is to compare characteristics of freshmen in a learning community with those not in a learning community.

Methodology

The population for this study was incoming freshmen in the College of Agriculture and Natural Resources who live in resident housing at Texas Tech University.

The data was collected using the 2007 CIRP Incoming Freshman Questionnaire developed by UCLA. The questionnaire was distributed to all 211 students in the population within the first week of the semester. Of the 211 questionnaires distributed 127 were completed and returned which results in a 60.2% response rate.

Data was collected on 41 different variables including various demographics, academic achievement, social history and time management. Data was computed using the SPSS software program to determine which variables differed between those students who chose to live in the learning community and those who chose alternative resident housing.

Results/Findings

Table 1 contains the characteristics that were observed for the students surveyed.

Table 1. Characteristics of Subjects

	Learning Community		Other Resident Housing	
Gender				
Male	22	(45.8%)	38	(55.9%)
Female	26	(54.2%)	30	(44.1%)
Age as of December 31, 2007				
17	1	(2%)	1	(1.5%)
18	37	(75.5%)	38	(55.9%)
19	11	(22.4%)	24	(35.3%)
20+	0	(0%)	5	(7.4%)
High School graduation year:				
2007	50	(100%)	59	(86.8%)
2006	0	(0%)	7	(10.3%)
2005 or earlier	0	(0%)	2	(3%)
High School Type:				
Public School	50	(100%)	57	(83.8%)
Public Charter or Magnet	0	(0%)	2	(3%)
Private, Religious	0	(0%)	4	(5.9%)
Home School	0	(0%)	5	(7.4%)
Previously earned credit at TTU				
Yes	6	(12%)	9	(13.4%)
No	44	(88%)	58	(86.6%)
Previously earned credit at other institution				
Yes	20	(40.8%)	23	(33.8%)
No	29	(59.2%)	45	(66.2%)
Accepted by first choice college				
Yes	48	(96%)	59	(86.8%)
No	2	(4%)	9	(13.2%)
Was choice was TTU				
First Choice	47	(94%)	52	(76.5%)
Second Choice	3	(6%)	16	(23.5%)

Conclusions and Recommendations

All subjects were found to be relatively homogenous. However, there seemed to be more variation within the students who lived outside of the learning community. Although these variations were limited, more research could help explain this relationship. The students living in the learning community were similar to those outside the community in graduation year, previously earned college credit, and percent accepted by first choice college. Despite these similarities there was a significant difference with more females and students who chose TTU as their first choice volunteering to live in the learning community.

Further research should be done to determine why the stated differences occurred and if this data is representative of larger populations. From the findings, it is suggested that recruitment strategies be developed to recruit more "non-traditional" students to live in the learning community. It is also suggested that a longitudinal study examining the effects of living in this learning community for an academic year be conducted.

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Extension Education within the Land-Grant University System

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Introduction

Cooperative Extension is a dynamic organization that seeks to meet the needs of a constantly changing society. Its ability to be successful in this mission is largely dependent upon the professional abilities of the extension agents interfacing with clientele (Stone & Coppernoll, 2004). Enrolling in an extension education undergraduate or graduate degree program is one way that agents prepare themselves for employment, yet little research has been conducted regarding the academic preparation of agents.

Conceptual Framework

The Ohio State model of extension education developed by Scheer, Ferrari, Earnest, and Connors (2006) was used as a framework for this research. The Ohio State model proposed aligning undergraduate and graduate courses with ten competency areas in which extension agents should be skilled. The competency areas are: (a) organizational knowledge, leadership, and management, (b) technology, (c) communication, (d) program planning, implementation, and evaluation, (e) applied research, (f) diversity and pluralism, (g) marketing and public relations, (h) theories of human development and learning, (i) risk management, and (j) community development process and diffusion.

Methodology

The purpose of this descriptive study was to develop an overview of extension education programs within the land-grant university system. The objectives of the study were to describe (a) the land-grant universities (LGUs) which offer extension education as a major, minor, master's, and/or doctoral degree, (b) the availability of distance-based extension education programs within the LGU system, and (c) the types of extension education courses offered at the undergraduate and graduate levels. This descriptive study used content analysis (Gall, Gall, & Borg, 2007) to gather data from the Web sites of LGUs. A census of the 1862, 1890, and 1994 LGUs was conducted in September 2007. The population for the study was restricted to the primary campus of each LGU. There were 75 LGUs and 33 tribal colleges included in this population. Only LGUs which *clearly* designated an extension education major, minor, concentration, program, emphasis, or specialization were considered to be formal providers of extension education.

Results/Findings

There were 19 LGUs that offered some type of academic program in extension education. Of these universities, 10 offered a major and six offered a minor in extension education. Eighteen LGUs offered a masters degree in extension education, while 12 universities had a doctoral program. Only Colorado State University, University of Florida, Louisiana State University, New Mexico State University, and North Carolina State University offered distance-based extension education programs.

The researchers identified 126 courses offered at the undergraduate level. The most frequently offered courses were in three competency areas: extension knowledge, leadership, and management (n = 37), theories of human development and learning (n = 19), and program planning, implementation, and evaluation (n = 16). There were 221 graduate courses listed for extension education. The most frequently offered courses were in the competency areas of applied research (n = 45) and theories of human development and learning (n = 37). Courses were least commonly found for risk management and marketing and public relations, at both the undergraduate and graduate levels.

Conclusions

Extension education programs were offered at nineteen land-grant universities (LGUs). Masters programs were the most common type of extension education program offered, followed by PhD programs. Only ten LGUs offered a major in extension education, while even fewer offered an extension education minor. The University of Maryland, Eastern Shore, was the only historically black college with a formal extension education program. The tribal colleges did not have any formalized extension education.

A variety of courses were offered in extension education. Topics related to (a) extension knowledge, leadership, and management, (b) theories of human development and learning, and (c) program planning, evaluation, and implementation were most common at the undergraduate level. Applied research courses were common at the graduate level, in addition to the aforementioned undergraduate course categories.

Implications/Recommendations

There appears to be a shortage of extension education programs offered nationwide, particularly at the 1890 and 1994 land-grant institutions. Without an extension education program offered at some level (whether undergraduate or graduate), students may fail to become fully aware of the career opportunities within Cooperative Extension. The number of distance-delivered programs falls far short of covering the needs of current and future extension agents, too.

The findings from this study indicate a deviation from the diverse framework proposed by Scheer et al. (2006). The high number of courses within a small number of competencies (at the graduate level, 67% of all courses resided within four competencies) implies that some competencies are perceived to be more important than others. LGUs with extension education programs are encouraged to critically examine their own curriculum to determine the appropriateness of their courses and the viability of offering courses online.

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Providing a Safer Consumer Product: Will Beef Cattle Producers Take the Next Step?

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Need for Research

Recent outbreaks of food borne illnesses have been linked to contaminated produce such as lettuce and spinach (CDC, 2007). The seriousness of these outbreaks highlights the need to prevent such contamination. A reservoir of *E. coli* O157:H7, an organism known to cause serious and potentially fatal illness, is the bovine intestinal tract (Grauke, 2002). This means that shedding of this pathogen in feces occurs during all stages of the bovine's life (Jennings, 2006). Efforts to decrease the incidence of *E. coli* O157 in ground beef have been successful; however contamination of other foods has become a problem (CDC, 2007). This should be cause for concern among beef cattle producers because *E.coli* O157 shed in bovine feces can contaminate produce when manure is used as fertilizer or when pathogens from feces seep into groundwater. Food and animal scientists have developed interventions that beef cattle producers can implement to reduce *E. coli* shedding in live cattle. The utilization of these pre-harvest practices by beef cattle producers should increase the safety of food products for consumers.

The National Research Agenda for Agricultural Education and Communications (2007) indicates a research priority area of identifying the "needs and competencies of stakeholders and professional practitioners in nonformal agricultural extension education". Additionally, a priority initiative within this research area is to "identify the technical agricultural needs of practitioners in various cultural and societal settings" (p. 14)

The purpose of this needs assessment was to determine beef cattle producers' attitudes and behaviors toward pre-harvest food safety. The research objectives were to determine the attitudes and behaviors regarding pre-harvest food safety of beef cattle producers attending the 2007 Cattle Industry Annual Convention and National Cattlemen's Beef Association (NCBA) Tradeshow, and explore the relationship between the two.

Theoretical Framework

The Theory of Planned Behavior asserts that human behavior is led by three primary beliefs; behavioral, normative, and control (Ajzen, 2002). Behavioral beliefs produce an attitude toward a behavior, normative beliefs refer to perceived social pressures to act a certain way, and control beliefs refer to an individual's perceived control over the situation (Ajzen, 2002). Ajzen (2002) proposed that these three beliefs combine to form an intention, and ultimately an action, or behavior. The more favorable behavioral and normative beliefs and greater the perceived control, the stronger the person's intention to perform the behavior should be (Ajzen, 2002). In this study, the more positive beef cattle producers' attitudes toward pre-harvest food safety, the stronger their intention to perform pre-harvest food safety behaviors should be.

Methodology

This was a quantitative, descriptive/correlational study. The data for this study was collected at the 2007 Cattle Industry Annual Convention and National Cattlemen's Beef Association (NCBA) tradeshow, February 1-2, in Nashville, Tennessee. Researchers used a convenience sample limited to a desired population. Four hundred sixty one instruments were collected. Two hundred eighteen of those instruments were correctly completed by beef cattle producers. The

instrument used was previously developed for use by Jennings (2006). Content and face validity were previously established. The instrument collected data for numerous studies. Section C was the only section pertaining to this study. The Cronbach's Alpha reported for this section was .92 (Jennings, 2006).

Findings

A 4-point Likert scale was used to obtain respondents' attitudes on five questions and behaviors on six questions. Mean scores for attitude statements ranged from 3.00 to 3.66, indicating a positive attitude toward pre-harvest food safety. Mean scores for behavior ranged from 2.71 to 3.16. A Pearson-product moment correlation was calculated to describe the relationship between attitude and behavior scores. The correlation coefficient calculated was .65. This indicates a substantial (Davis, 1971) positive relationship. The r^2 value is .42. This coefficient of determination indicates that 42% of the variance in one variable can be explained by variance in the other variable.

Table 1
Attitudes and behaviors of beef cattle producers regarding pre-harvest food safety

Statement	*n*	Mean (*M*)	SD
Attitude			
1. I believe that pre-harvest efforts to reduce pathogens are important	213	3.22	.79
2. Others expect me to provide a safe beef product	215	3.66	.63
3. I am ultimately responsible for the image of the beef industry as it is portrayed to the public	214	3.60	.65
4. It is mostly my responsibility to reduce the number of pathogens in beef and beef by-products	214	3.07	.82
5. It would be possible for me to have an impact on the number of food-borne illnesses in the United States	213	3.00	.90
Behavior			
6. I deliberately look for better ways to make beef products safer	215	3.16	.79
7. I encourage colleagues in the food industry to adopt new food safety interventions	212	3.02	.82
8. I am up-to-date on current beef industry research regarding food safety	213	2.71	.88
9. I currently advocate using pre-harvest interventions that reduce the occurrence of pathogens in beef	213	2.74	.85
10. I will contact my government representatives to voice my opinion when it is important	214	2.88	.87
11. I have changed practices in my business to improve the safety of the beef we produce	214	3.09	.86

Conclusions

The substantial positive relationship found between beef cattle producers' attitudes and behaviors regarding pre-harvest food safety supports the Theory of Planned Behavior. The more favorable a beef cattle producer's attitudes and beliefs regarding pre-harvest food safety, the stronger the person's intention to perform the food safety behavior. Educators can utilize the relationship between attitudes and behaviors in the development of educational materials for beef cattle producers which could have a positive impact on beef cattle producers' adoption of pre-harvest food safety measures, and in turn have a positive effect on the reduction of food borne illnesses.

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Seven Years of Stakeholder Evaluation Trends Regarding Experiential Learning

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Introduction

Residential camps for youth provide a unique setting to enhance life skill development through experiential learning. Evaluating this experience is essential to providing consistent quality programs for youth. Parents are important partners in the evaluation process because they can offer insights into behavior changes before and after the camp experience. Virginia Tech faculty collaborated with camp directors from Virginia's 4-H centers to develop a standardized multi-year, multi-site camp evaluation model. A different sample of camper parents were surveyed in 2001, 2004, and 2007 to determine if life skills learned at camp impacted behavior changes when campers returned home.

Theoretical Framework

This study explored trends in parent satisfaction with the camp experience and their perceptions of the developmental outcomes attributed to camp participation. The study was grounded in a youth development model that emphasizes the developmental assets of youth. The Targeting Life Skills (TLS) Model (Hendricks, 1996) has been cited in studies in the agricultural education and leadership fields and provided the conceptual framework for the development of the parent questionnaire. The TLS model, which identifies specific, measurable outcomes on which youth development programs can be evaluated, has been successfully used in previous research to evaluate camp outcomes (Arnold, Bourdeau, & Nagele, 2005; Garst & Bruce, 2003; Hines & Riley, 2005). Applying the TLS model in this study on trends in parental self-reports of the impact of experiential learning at camp will benefit the agricultural education field by providing a model for involving stakeholders in the evaluation of experiential based youth programs across multiple sites over time.

Methods

A random sample of male and female campers, ages 9-13, from each of six 4-H centers was selected. A questionnaire was mailed to the sampled parents/guardians (2001, n= 363; 2004, n=326; and 2007, n=318) two weeks after camp. A follow-up post card was sent four weeks later to increase response rate (Dillman, 2007). The parent survey included questions regarding satisfaction with camp, intentions to continue participation, and a 24-item retrospective pre/post-test questionnaire that assessed life skill behavior change across eight domains of the TLS Model: living, being, giving, caring, relating, thinking, managing, and working (Rockwell & Kohn, 1989).

For each year, paired t-test comparisons were made between each of the "before camp" and "after camp" means. A comparison of mean ranks of life skill behavior impacts across all three data sets was constructed to examine changes in parent perceptions. Additionally, the male and female campers were compared separately using paired t-tests to compare before and after means. Additionally, principal component factor analysis (Crocker & Algina, 1986) was used to verify construct validity and reliability of the instrument.

Results

In 2001, the top six ranked life skills were: "takes care of his/her own things," "shares work responsibilities," "takes initiative and is a self-starter," "takes responsibility for his/her own actions," "handles successes and failures," and "has a good mental attitude." In 2004, the top six ranked life skills were: "shares work responsibilities," " tries to find answers to questions," "takes responsibility for his/her own actions," "adapts to change," "listens to the opinions of others," and "tries to find solutions to problems." Similarly, in 2007, the top six ranked life skills were: "shares work responsibilities," "takes care of his/her own things," "has a good mental attitude," "listens to the opinions of others," "deals effectively with conflict," and "considers choices before making a decision."

Similarities and differences between life skill outcomes for male and female campers were compared. Male campers tended to have a greater degree of change (2004 & 2007) than female campers (as indicated by gain scores). Similarities were marked by a sharing each year of two of the top seven life skill outcomes by male and female campers. These shared outcomes included "shares work responsibilities," and "takes care of his/her own things." These similarities indicate individual camper (rather than gender-related) benefits as perceived by parents/guardians and implies an appropriateness in activities and curricula within the camping structure for both genders.

Conclusions

According to parents/guardians, youth who participated in experiential learning opportunities at camp set priorities and goals, take responsibility, participate in discussions, and are cooperative team players following exposure to camp. The overall camp program has consistently increased camper life skills over seven areas. The top two life skills, "shares work responsibilities" and "takes care of his/her own things" have been the most consistent. These results show an overall program quality from year to year despite normal changes in staffing, food, facilities and activities.

Practical Applications

Utilizing a standardized survey over time and across sites can be a useful way to measure program outcomes in an experiential learning environment. Comparing results of standardized surveys may also reveal important differences within participant groups based on gender, age or some other criteria. Looking beyond participant evaluation to other stakeholder groups such as parents can yield important information for triangulation with camper data. A systematic approach to tracking yearly activity changes may help explain exactly how different life skills are impacted. This study provides a model for evaluating youth outcomes in multi-site non-formal and experiential learning programs with stakeholders. Consistent, rigorous evaluation over time provides measures of overall program quality and consistency, providing decision makers with valuable program outcome information.

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An Assessment of Minor Crop Producers' Extension and Education Needs

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Introduction

Cooperative Extension (CE), with its rich history that spans more than a century of service, has been potentially the only source for research based knowledge that producers receive through demonstration and educational programs (Seevers, Graham, Gamon, & Conklin, 1997). Today there are now many sources that producers may choose from to obtain crop production information. Therefore, Extension educators must assess producers constantly to ensure they are meeting their research and educational needs (Kotile & Martin, 2000). Assessment of producers has shifted to two-way communication channels between Extension educators and producers in agriculture in the twenty-first century (Greene, 1988).

Theoretical Framework

The extent to which Oklahoma minor crop producers use CE varies just as different audiences rely on the adaptation of various communication strategies in order to learn new knowledge (Lionberger & Gwin, 1982). The theoretical framework for this study was stakeholder engagement (Greene, 1988). Combining information, views, and needs of producers with Extension educators in planning programs allows stakeholders to influence the direction of the programs and the method of program delivery to insure participation and success (Lionberger and Gwin, 1982). Stakeholder engagement in the decision-making, planning, and implementation processes is important in order to meet the needs of stakeholders and to provide them with a voice in regards to CE education programs and the dissemination of land-grant university and CE publications.

Purpose and Objectives

The purpose of this study was to determine the use and needs of CE and to discover where producers obtain crop production information. The specific objectives of this study were to: 1) Identify the types of events that Oklahoma minor crop producers attended to learn about crop production and 2) Discover preferred delivery methods to aid producers in obtaining Cooperative Extension crop production information.

Methodology

A two-step survey method (Dillman, 2000) was used to collect data for this study. The population for the study consisted of 6,870 Oklahoma producers who grew one or more of the following crops: cotton, soybeans, field corn, sorghum, or peanuts in 2006. The sample was drawn from the population (N = 6,870) and consisted of a randomly stratified sample (n = 1,899) based upon the crop. The self-administered mailed survey was checked for face, content, and construct validity by a panel of experts consisting of faculty employed by the land-grant university with expertise in entomology, plant pathology, and plant and soil science. Expert panels are used to prevent measurement error that occurs in survey research (Lindner, Murphy, & Briers, 2001). Four hundred and seventy-one (471) of the 1,899 surveys were returned of which 223 valid surveys were usable, thus providing a response rate of 12 percent.

Results/Findings

Minor crop producers attended CE field days most frequently, followed by crop consultant programs and visits to learn about crop production information. More than 50 percent of the producers worked with CE personnel to learn about new production practices and communicated most with their local county Extension educators followed by their area Extension specialists. Sixty-seven percent of the producers noted that they used Cooperative Extension to obtain crop production information followed by seed suppliers/dealers and crop consultants. Producers used many other sources to obtain information including friends, family, other producers and newsletters. Producers indicated that there are various ways in which they would like to receive communication and crop production information from CE. Newsletters were requested most followed by weekly bulletins on crop production issues and field day workshops and programs.

Conclusions

Conclusions drawn from this study include: 1) CE may not be marketing educational programs effectively to meet the educational meets of minor crop producers. 2) Local Extension educators are not actively engaging stakeholders frequently enough to assess their needs and to establish relevant programs and field days. 3) Extension educators should discover why producers are seeking out crop consultants over Extension for crop production information. 4) Producers prefer receiving Extension information in the mail in newsletter format to new electronic formats.

Implications/Recommendations

To remain effective for the next century, Extension educators must market their educational programs more effectively to reach targeted producers. Extension educators should engage local producers and conduct formal needs assessments before developing their programs. The needs assessment should determine gaps in knowledge or training and the preferred methods of information exchange and training. Furthermore, Extension educators must invest in producing crop production materials in formats to meet producers' preferences. The future success of Extension relies on quality and in-depth stakeholder engagement in order to provide relevant research-based programs to producers and other CE stakeholders.

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Understanding the Strengths of our Future Agricultural Leaders

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Introduction

The National Research Agenda for Agricultural Education and Communication includes a research priority to "Recruit and prepare students for the future workforce in the agricultural and life sciences" (Osborne, 2007, p. 16). Another research priority area focuses on "leader succession in sustaining agricultural enterprises" (Osborne, p. 12). With these priorities in mind, it is helpful to consider who these students and future leaders are and what strengths they bring to the field. One place to look is among emerging leaders from high schools around the country.

The Virginia Governor's School for Agriculture (VGSA) is a month-long residential academic program for high school juniors and seniors. VGSA students attend classes on Virginia Tech's campus and complete small group research projects in the areas of agricultural economics, agricultural leadership, animal science, natural resources, plant science, and veterinary medicine. VGSA students are selected competitively by application from Virginia's public, private, and home schools ("Virginia Summer Residential Governor's School for Agriculture," 2006). Attendees at the 2007 VGSA completed several leadership assessments, including the Clifton StrengthsFinder, a tool for indentifying personal talents.

Conceptual or Theoretical Framework

The Clifton StrengthsFinder is based on Strengths Psychology (Rath, 2007), which has its roots in Positive Psychology, "the pursuit of understanding optimal human functioning" (S. Lopez, 2006, para 1). "The aim of positive psychology is to catalyze a change in psychology from a preoccupation with repairing the worst things in life to also building the best qualities in life… At the individual level it is about positive personal traits—the capacity for love and vocation, courage, interpersonal skill, aesthetic sensibility, perseverance, forgiveness, originality, future-mindedness, high talent, and wisdom" (Seligman, 2007, p. 3).

When applied with students, the Clifton StrengthsFinder assessment is part of an overall program for developing personal talents into strengths. The StrengthsQuest Program asserts that 1) everyone has talents, 2) a person's greatest talents hold the key to personal excellence, 3) becoming aware of talents builds confidence, 4) learning to develop and apply strengths improves levels of achievement, 5) each talent can be applied in many areas, and 6) achievements increase as a person develops and applies their personal strengths (Anderson, 2004).

Methodology

As part of their core curriculum, the 91 participants in the 2007 Virginia Governor's School for Agriculture completed the Clifton StrengthsFinder as an Online measure of personal talent. Participants received immediate feedback and ranking of their top five signature themes (areas of talent). Their complete ranking was collected by The Gallup Organization, which then prepared a composite ranking for the entire group.

The Clifton StrengthsFinder is composed of 180 item pairs, groups into 34 themes of talent. For a detailed discussion of validity and reliability, see *The Clifton StrengthsFinder Technical Report: Development and Validation* (S. J. Lopez, Hodges, & Harter, 2005).

Results/Findings

For the 2007 Virginia Governor's School for Agriculture group of scholars, the top five signature themes (or areas of talent) and descriptions (quoted from "StrengthsQuest reference card," 2000) are as follows:

- **Achiever:** People especially talented in the Achiever theme have a great deal of stamina and work hard. They take great satisfaction from being busy and productive.
- **Learner**: People especially talented in the Learner theme have a great desire to learn and want to continuously improve. In particular, the process of learning, rather than the outcome, excites them.
- **Responsibility:** People especially talented in the Responsibility theme take psychological ownership of what they say they will do. They are committed to stable values such as honesty and loyalty.
- **Positivity:** People especially talented in the Positivity theme have an enthusiasm that is contagious. They are upbeat and can get others excited about what they are going to do.
- **Competition:** People especially talented in the Competition theme measure their progress against the performance of others. They strive to win first place and revel in contests.

Conclusions

These five areas of talent offer insight into the potential strengths of our future agricultural leaders. Based on the theory of positive psychology, these talents should be the focus of development for these future leaders of the agricultural industry.

Implications/Recommendations

As agricultural educators, our role in the StrengthsQuest program is to help students identify develop their talents into personal strengths and then match those strengths with the future leadership needs of the agricultural industry.

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Student Teacher Data Collection Yields Positive Results

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Introduction

While it is difficult to overstate the importance of the student teaching experience, it is also difficult to capture and analyze the volume of data that the student teaching experience generates. "Student teaching is a complex learning experience that requires careful supervision. Cooperating teachers must create a sustaining environment that will facilitate maximum development of student teachers" (Kuehl 1984, p. 2). Documenting and managing data for a complex learning experience such as student teaching has proved challenging for teacher educators.

Conceptual / Theoretical Framework

The University of Georgia has identified nine standard areas that graduates of the program will be able to perform in. The areas are: (1) Content and Curriculum, (2) Knowledge of Learners, (3) Learning Environments, (4) Assessment, (5) Planning and Instruction, (6) Professionalism, (7) Future Farmers of America (FFA), (8) Experiential Learning, and (9) Program Management.

Methodology

In Agriculture Education many institutions have adopted a "home grown" evaluation system consisting of various evaluation forms and rubrics that are completed by the student teacher, the supervising teacher, and the university supervisor. These forms are most often completed by hand and assembled in a notebook and/or portfolio that the student teacher presents at the conclusion of their student teaching experience. In 2006 the University of Georgia developed an online data collection system to allow student teachers, supervising teachers, and university supervisors to submit qualitative and quantitative data regarding the student teaching experience online directly into a collective database.

Results

Student teachers, cooperating teachers, and university supervisors are each asked to rate students on their performance in each standard related to knowledge, skills, and dispositions. A summated rating scale from 1 (Needs Improvement) to 5 (Excellent) was used. A summary of the aggregate data is below.

Table 1
Descriptive statistics for the GSTEP framework.

	Minimum	Maximum	Mean	Std. Deviation
Content and Curriculum	3.00	5.00	4.51	0.52
Knowledge of Learners	3.00	5.00	4.47	0.52
Learning Environments	3.25	5.00	4.51	0.47
Assessment	3.00	5.00	4.31	0.61
Planning and Instruction	3.00	5.00	4.49	0.64
Professionalism	3.50	5.00	4.74	0.45

Note. 1=Needs Improvement; 3=Average; 5=Excellent

While data presented in the Table 1 provides a broad summary of performance data, the findings in Table 2 below provide data indicating candidate success in exhibiting more specific standards. In addition to these assessments and the data reported on the initial program report, agricultural education faculty also have data from reflective journals, student teaching experiences checklists, and pre-observation and professional growth forms.

Table2

Supervisor, Cooperating Teacher, and Self-appraisal of Student Performance on Specific Instructional Strategy and Performance Criteria Competencies

	University Supervisor		*Cooperating Teacher*		*Self Appraisal*		*Total*	
	M	SD	M	SD	M	SD	M	SD
Set	4.36	.990	4.50	.789	3.50	.548	4.38	.896
Obj	4.23	.912	4.62	.635	3.50	.548	4.38	.814
Inp	4.59	.542	4.62	.567	3.50	.548	4.54	.610
CFU	4.39	.618	4.64	.598	3.00	.632	4.43	.714
MIB	4.55	.504	4.66	.557	4.00	.000	4.57	.537
PGP	4.55	.589	4.70	.505	3.17	.408	4.54	.642
App	4.39	.868	4.66	.626	3.00	0.00	4.44	.820
Close	3.98	1.15	4.46	.676	3.0	.000	4.16	.972
Clar	4.30	.823	4.44	.787	3.17	.408	4.30	.835
Var	4.55	.627	4.60	.606	3.17	.108	4.49	.689
Enth	4.23	.831	4.66	.658	3.83	.408	4.42	.768
TO	4.57	.818	4.60	.728	3.17	1.17	4.50	.859
O2L	4.55	.730	4.64	.663	2.83	.9830	4.49	.823
SLE	4.59	.497	4.66	.593	2.67	.816	4.51	.732

Note. 1=Needs Improvement; 3=Average; 5=Excellent
Set=Established Set; Obj.=Stated Lesson Objectives; Inp=Provided Input; CFU=Checked for Understanding; MIB=Modeled Ideal Behavior; PGP=Provided Guided Practice; App=Application of Concepts to Student Experiences; Close=Achieved Closure; Clar=Clarity; Var=Variety; Enth=Enthusiasm; TO=Task-oriented; O2L=Opportunity to Learn; SLE=Students and the Learning Environment.

Implications

In previous years copious amounts of data along with antidotal data have shaped the direction of the Agriculture Education Program at the University of Georgia. However with increased accountability standards being enforced by the National Council for Accreditation of Teacher Education (NCATE) this type of easily accessible, qualitative data will help in documenting student teacher performance during the student teaching experience.

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Assessing the Employability Skills of Graduates in Hard vs. Soft Disciplines in a College of Agriculture

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Introduction and Theoretical Framework

Employers are dissatisfied with the level of competence graduates possess pertaining to the employability skills needed for success in the workplace (Evers, Rush, & Berdrow, 1998). As such, it is becoming increasingly more important for graduates to be able to transfer the knowledge they learn in the college classroom to the workplace (Billing, 2003; Crebert, Bates, Bell, Patrick & Cragnolini, 2002). Knight and Yourke (2003) opined that a reason graduates are ill-prepared in the way of employability skills could be because faculty are mostly concerned with teaching technical content to students. Specifically, "It could be objected that higher education is primarily about developing advanced understanding of worthwhile subject matter, not about employability" (p. 8). However, could it be that different disciplines are more equipped at teaching employability skills to students?

Neumann, Parry, and Becher (2002) identified ways in which disciplines could be compared to each other (i.e., hard vs. soft). Specifically, the authors stated that hard disciplines focus on cumulative knowledge with a quantitative focus where the curricula are linear and hierarchical and the structure of the course is predominately teacher-led and rigid. In contrast, soft disciplines focus on holistic knowledge with a qualitative focus where the structure of the course is open and loose and student-oriented. In addition, soft disciplines focus on generalizable/transferable skills (i.e., analytic skills, creativity, and lifelong learning), while with hard disciplines "the claim is rarely made for the development of widely transferable skills" (p. 410). To that end, are graduates from soft disciplines more competent at performing employability skills than those from hard disciplines?

Purpose and Objectives

The purpose of the study was to assess the employability skills needed in the workplace of College of Agriculture (COA) graduates (January 2005 to May 2006) in hard and soft disciplines at a southern Land-Grant institution. The study sought to: 1) describe the responding COA graduates by academic major; 2) describe graduates' perceptions of how important the employability skills are to their careers; and 3) describe graduates' perceptions of their level of competence at performing the employability skills in their respective careers.

Methodology

The design of the study was survey research and employed a questionnaire which asked graduates to rate their perception of the importance of the employability skills to their jobs. In addition, graduates were asked to rate their self-perceived level of competence at performing the employability skills in their job. The scale ranged from 0 – no importance (or competence) to 3 – major importance (or competence). Data were analyzed using descriptive statistics. A random sample (N = 235) was taken from the population (N = 594). Fifty-seven usable questionnaires were returned for a 24% response rate.

Findings

Objective one revealed that there were 32 graduates comprising hard disciplines and 25 graduates comprising soft disciplines. Hard disciplines consisted of: agricultural biotechnology

(n = 5), animal science (n = 11), forestry (n = 3), individualized agriculture studies (n = 1), landscape architecture (n = 2), natural resources (n = 4), plant and soil sciences (n = 5), and production agriculture (n = 1). Soft disciplines consisted of: agricultural economics (n = 8), public service leadership (n = 8), agricultural education (n = 4), agricultural communications (n = 4), and family studies (n = 1).

The findings of the study revealed that graduates of hard disciplines perceived motivation (M = 2.63), listening (M = 2.59), and problem solving and analytic (M = 2.54) as the top three most important employability skills, and visioning (M = 1.82) as the least important. Graduates of soft disciplines perceived problem solving and analytic (M = 2.77), oral communication (M = 2.63), and written communication (M = 2.58) as the top three most important employability skills, and coordination (M = 2.04) as the least important.

Graduates of hard disciplines perceived themselves to be most competent at performing the following employability skills: managing conflict (M = 2.44), lifelong learning (M = 2.42), and visioning (M = 2.39), and least competent at creativity, innovation, and change (M = 1.64). Graduates of soft disciplines perceived themselves to be most competent at listening (M = 2.66), interpersonal relations (M = 2.57), and motivation (M = 2.42), and least competent at visioning (M = 1.86).

Conclusions and Recommendations

Graduates representing hard disciplines were most apt to respond to the study as compared to those representing soft disciplines. In all, graduates in animal science (hard) had the largest response rate followed by agricultural economics (soft) and then agricultural biotechnology (hard) and plant and soil science (hard).

Graduates from soft disciplines rated 10 of the 16 skills more important to their job than did graduates from hard disciplines. Neumann et al. (2002) stated that soft disciplines focus on analytic, creativity, and lifelong learning skills. This study was consistent in that graduates in soft disciplines perceived themselves to be more competent with their ability to employ problem solving and analytic and creativity, innovation and change skills in their job. However, this study found that graduates in hard disciplines were more competent at performing lifelong learning skills in their jobs. This finding could be because graduates in hard disciplines rated lifelong learning higher than did graduates in soft disciplines. In all, graduates in soft disciplines perceived themselves to be more competent at performing the said employability skills as compared to their hard discipline counterparts.

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EXPERIENCES OF FIRST YEAR AGRICULTURAL EDUCATION TEACHERS

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Introduction/Theoretical Framework

First year teachers face many challenges in the classroom. Agricultural Education teachers' challenges are compounded by the added responsibilities of advising the FFA chapter and supervising students supervised agricultural experience programs (SAEs). Mundt and Connors (1999) identified the greatest challenges facing beginning teachers as management of local FFA activities and balancing responsibilities, both professional and personal. Moreover, Myers, Dyer, and Washburn (2005) found that planning FFA activities and classroom behavior management were among the top concerns of beginning agriculture teachers in Florida. Related to these findings, Croom (2003) stated that "agriculture teachers experience moderate levels of emotional exhaustion in their work," but also feel "a high degree of personal accomplishment in their work" (p. 11). Talbert and Camp (1994) explained that while literature predominantly points to the first year teachers as experiencing overwhelming problems and frustrations "not all first-year experiences are bad" (p. 35). This study sought to identify both the success and challenges of first year agriculture teachers.

The theoretical framework for this study was the Herzberg's Motivation-Hygiene Theory (McClelland, 2004). This model identifies two components: 1) hygiene (the job environment) and 2) motivation (what people actually do on the job). Both hygiene and motivation occur simultaneously. This study sought to describe the success and challenges of first year Agricultural Education teachers.

Methodology

The purpose of this study was to explore experiences of first year Agricultural Education teachers. The following research objectives were developed:

1. Describe the successes that first year Agricultural Education teachers encounter within the context of classroom instruction, FFA, and SAE supervision.
2. Describe the challenges that first year Agricultural Education teachers encounter within the context of classroom instruction, FFA, and SAE supervision.

This qualitative study was descriptive in design. Long interviews were conducted via telephone to capture rich descriptions of the successes and challenges of the first year teachers. The population for this study included [institution] alumni who completed their first year teaching in Agricultural Education during the 2006-2007 academic year (N = 6). All six chose to participate in the study giving a response rate of 100%. First year teachers are identified by participant number in the text to protect the identity of the subjects. Interviews adhered to a structured interview schedule. The interviewer also engaged participants with probing questions to explore emerging themes during interviews. The interview transcripts were analyzed for emerging themes and the data were categorized. Participants' responses were used to draw conclusions and recommendations. Due to the nature of this study, results can only be generalized to the first year teachers from [institution].

Results/Findings

Regarding successes in classroom instruction, "students learned a lot" was the most frequent response. Additionally, 4 teachers identified a positive response from students when they incorporated behavior management techniques. Two teachers also commented that "variability" was a success in classroom instruction. In advising the FFA, 4 teachers identified "getting students to participate in FFA activities" as a success. Four teachers also described their pride in various members' leadership abilities in their FFA chapters. Furthermore, 3 teachers stated that members were highly involved specifically in community based activities. Three teachers stated that they went on multiple SAE visits as a success in SAE supervision. Two teachers described that they were able to integrate SAE into classroom instruction. Additionally, 2 teachers identified their success when some students established SAEs.

Five out of the six teachers stated they experienced behavior management challenges in their classroom. Teachers identified disrespect from students, strict school rules, and a lack of a behavior management system as contributors to this challenge. Two teachers described challenges making accommodations for students with IEPs. In FFA, 2 teachers stated motivating students to participate in CDEs was challenging. Two teachers mentioned training CDE teams as a challenge while 2 others identified time management as a challenge. Regarding SAE supervision, three teachers stated that the biggest challenge was that no previous SAE programs existed at their schools and two teachers experienced difficulty in motivating students to participate in the SAE component.

Conclusions, Implications, and Recommendations

Successes identified in the classroom included student learning, behavior management, and variability in instruction. Challenges included behavior management and accommodating for students with IEPs. Teachers identified multiple successes with SAE supervision including conducting multiple student SAE visits, integrating SAE into the classroom, and establishing some SAEs. The most widespread challenge for teachers was that no prior SAE programs existed at the school. In addition, teachers had difficulty motivating students to conduct SAEs. In advising the FFA chapter, teachers identified increasing student participation in activities and getting members involved in community activities as great successes. Teachers were challenged to motivate students to be involved in activities, to train CDE teams, and in time management.

Based upon the conclusions of this study, the researchers offer the following recommendations. The new teacher workshop in this state should be expanded to include areas in SAE, classroom instruction, and FFA advisement. It is also recommended that professional development in SAE supervision be a priority for all Agricultural Education teachers in the state

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Experiences of Agricultural Education Student Teacher Interns

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Introduction/Theoretical Framework

Student teaching is the culminating experience for pre-service educators. It has been postulated that the concerns and frustrations that teachers experience may be stronger for student teachers. Fritz and Miller (2003) found that the concerns of agricultural education student teachers were consistent with the concerns of beginning teachers. Student teachers were more concerned with subject matter material and discipline problems than any other aspect of student teaching.

Discovering how student teachers spend their time can help teacher educators further refine their respective programs (Torres & Ulmer, 2007). Teacher educators may identify beneficial experiences that student teachers are currently taking advantage of and those which may need to be added to programs. In addition, qualitative research is needed regarding the student teaching experience (Harlin, Edwards, & Briers, 2002) which answers the question: What are the perceptions of student teachers during the student teaching experience?

The theoretical framework for this study is the Herzberg's Motivation-Hygiene Theory (McClelland, 1987). Herzberg conceptualized two components of motivation: 1) Hygiene (the job environment) and 2) motivation (what people actually do on the job). According to Herzberg, both hygiene and motivation occur at the same time. However, if beginning teachers are not adequately prepared for teaching, both the hygiene and motivator factors may prove to facilitate negative experiences in the classroom. This study seeks to identify how well beginning Agricultural Education teachers are prepared for their employment experiences.

Methods

The purpose of this descriptive study is to describe experiences of Agricultural Education student teacher interns within the student teaching internship at a southern land grant university. Specifically, the study sought to examine the following objectives: 1) Identify personal characteristics of student teachers, and 2) Describe the experiences of student teachers in terms of teaching, supervising SAE programs, and advising FFA

The population for the study consisted of Agricultural Education student teachers at a land grant university located in a southern state (N = 13). A quantitative methodology was implemented. Descriptive statistics of frequencies, percentages, means and standard deviations were reported for objectives one and two.

Results

Student teachers in Agricultural Education at this land grant university were female (n = 7, 53.85%) and male (n = 6, 46.15%), with an ACT score of M = 24.46, and university GPA of M = 3.33. In May 2007, all student teachers (n = 13, 100%) earned teaching certification in Agriculture (5-12). A majority of student teachers were former FFA members (n = 12, 92.31%), and possessed leadership experience through serving as a chapter (n = 10, 76.92%), regional (n = 6, 46.15%), and state officer (n = 4, 30.77%). Eleven (84.62%) student teachers chose to major

in Agricultural Education because of their Agricultural Education teacher and two (76.92%) because of his/her interest in agriculture.

Objective two described the type of experiences student teachers received throughout the 15 week student teaching internship experience at this university. Agricultural Education student teachers reported observing 951 class sessions, teaching 1,397 classes, conducting 56 SAE visits, and advising 301 FFA activities. Student teacher interns observed class periods in week 1 most frequently (*f* = 205). The week student teacher interns taught the most was week March 5-9 (*f* = 163). Student teacher interns reported making 10 SAE visits in the final week of their experience. Sixty-one FFA activities were advised by student teachers the week of February 19-23 (National FFA Week).

Conclusions

Agricultural Education student teachers at this university are majority female, with an ACT score of 24.46 and GPA of 3.33. All student teachers earned teaching certification (5-12) in May 2007. A majority were former FFA members and possessed leadership experience through serving as chapter officers. Several student teachers were officers at regional and state levels.

Experiences student teachers receive throughout the 15 week student teaching internship at this university include classes taught, classes observed, FFA activities advised, and Supervised Agricultural Experience (SAE) programs supervised.

Agricultural Education student teachers teach more classes than they observe. Student teacher interns observe the most in their first week at their cooperating teacher site. The greatest teaching experience for student teaching interns was gained in week 8: March 5-8. The week most student teacher interns conducted their SAE visits was week 15, their final week of their experience. FFA activities were advised by student teacher interns the most during National FFA Week (February 19-23).

Recommendations

Although the balance between teaching and observing is made, it is recommended student teacher interns teach more courses earlier in the semester. Furthermore, to fully gain a realistic student teaching experience, student teachers must assume responsibility for a full load in student teaching. Therefore, teacher educators at this institution should communicate this expectation to cooperating teachers in the orientation meeting and again when making visits throughout the student teaching internships.

It is recommended other university teacher education programs evaluate their student teacher internship. Examining the length and type of teaching, advising, and supervising experiences student teachers gain is important to improve the internship program. In addition, gaining perceptions of student teacher interns of the experience through their reflections will provide a greater perspective on the process.

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GENDER DIFFERENCES AMOUNG AGRICULTURAL EDUCATION INSTRUCTORS ATTITUDES' TOWARD INFORMATION TECHNOLOGY

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Many changes have taken place in agricultural education over the past decade, primarily in the area of information technology. Technology has played an important role in agricultural education (Kotrlik, Redmann, & Douglass, 2003). This change is even more important for agricultural education and other career and technical education teachers since CTE students are twice as likely to use computers as academic students (Heaviside, 1992).

Numerous studies have been conducted to determine the attitudes of agricultural education teachers toward the adoption of information technology innovations such as the internet, email, CD's, etc. Evidence that agricultural science teachers in Texas have adopted computers and specific innovations of information technology has been reported by Fraze, Fraze, Baker, & Kieth (2002). A study by Kotrlik, et al. (2002) concludes that technology is being integrated by Louisiana agricultural science teachers in the teaching/learning process to a moderate extent. The agriscience teachers are more active in the areas of exploration of the potential of using technology in the teaching/learning process, and in adopting technology for regular classroom use. Fraze et al. suggested that the adoption of computers, email, and the internet have all moved beyond awareness and learning stages therefore the use of information technology has reached critical mass for those innovations. Fraze et al. also suggested that the agricultural science teachers from Texas had favorable attitudes toward most forms of information technology; however, they indicated that other innovations needed to be explored. As active as these streams of research have been, none have focused on the possible impact of gender.

Gefen and Straub (1997) indicated that women and men differ in their perception of email, but not the use. Studies have found dramatic differences between the sexes, indicated that women had significantly higher computer anxiety than their male counterparts (Gilroy and Desai, 1986). Frankel (1990) suggested that the computer culture is uncomfortable for girls and women. Chen (1986) and Massound (1991) found that men held more positive attitudes of interest in, and confidence with computers, and had lower computer anxiety than woman.

Theoretical Framework

The theoretical perspective that guided the review of literature and the current study was the Diffusion of Innovations Theory developed by Rogers (1995). Rogers' diffusion theory has been used for many years to describe innovation diffusion and the adoption or rejection of innovations. Rogers described the five stages of the innovation-decision process as knowledge, persuasion, decision, implementation, and re-invention.
The five stages are all relevant to this study as well as adopter categories.

Adult learners, as Russell proposed (1995), pass through six stages of adoption. He suggested that learners could begin at any stage and progress at their own rates. The stages

included awareness, learning the process, understanding the application of the process, familiarity and confidence, adoption to other context, and creative applications to new contexts.

Purpose

The purpose of this study was to assess gender differences related to the agricultural education instructors' attitudes toward information technology. This study also determined what relationship, if any, existed between demographic and program variables with teachers' attitudes. The sample consisted of 333 secondary agricultural education instructors.

Methodology

A researcher-modified version of the Teachers Attitude toward Information Technology Questionnaire (TAT v. 2.0) (TCET, 2000) was used to determine subjects' attitudes toward information technology. The TAT version 2.0 consisted of five 10-item semantic differential sub-scales and modified by the researcher to assess teachers' attitudes toward Computer Aided Design, Computerized Record Books, email, Online Career Development Registration, and the Internet. The background information section of the instrument was used by the researcher to obtain demographic and agricultural education program data relevant to the study.

The demographic and program variables for each respondent were classified as independent. Teachers' attitude scores for each innovation were classified as dependent variables. The mean attitude scores of both genders were compared using an independent t test and Analysis of Variance (ANOVA). An independent t test was used to compare the differences between the two means, whereas an ANOVA was used to compare the mean differences among two or more variables (Burns, 2000). Statistical analysis using SPPAA 13.0 for Windows Student Version was used to analyze the data. The data collection procedure followed the Dillman (2000) model for mailed questionnaire administration.

Results

The study reported new information regarding gender differences among agricultural education teachers' attitudes toward five specific innovations of information technology. Favorable attitudes toward information technology were identified for both males and females. The innovation with the highest mean attitudes score was the Internet for both genders. Results of this study may assist professional development providers to improve their information technology training programs for agricultural education teachers as well as other secondary instructors. Results of this study may be of use to agricultural educators, teacher educators, technology trainers, technology coordinators, and administrators.

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Implications of Maintenance and Motivator Factors on Extension Agent Turnover

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Introduction/Need for Research

The retention of extension agents was identified as a challenge by the Extension Committee on Organization and Policy's Leadership Advisory Council (2005). This is a significant problem for Cooperative Extension, as the organization loses both time and financial resources when burnout and employee turnover occur (Ensle, 2005). The organization may spend as much as 150% of the employee's salary to hire another individual (Friedman, Galinsky, & Plowden, 1992).

Theoretical Framework

Herzberg's (1968) Motivation-Hygiene Theory proposed that job satisfaction and job dissatisfaction are affected by disparate factors known as motivators and maintenance factors. Motivators include challenging work, recognition, and responsibility; they provide employees with a positive satisfaction as a result of being intrinsically motivated (Hackman & Oldham, 1976). Maintenance factors include status, job security, salary and fringe benefits. Although an employee may become dissatisfied with his/her job when maintenance factors are absent, the presence of maintenance factors does not provide positive satisfaction (Hackman & Oldham).

Methodology

The purpose of this study was to synthesize selected research studies related to extension agent turnover. Specifically, the study described motivator and maintenance factors identified in the literature as affecting job satisfaction and job dissatisfaction. The six steps described by Roberts (as cited in Marsh, 1991) for conducting an integrative inquiry were followed for this study. A computer library search was conducted at a Research I institution to identify research studies published in the *Journal of Agricultural Education*, *Journal of Southern Agricultural Education Research*, *Journal of Extension*, *Dissertation Abstracts International*, and the proceedings of the national Association for Agricultural Education research conference between 1987-2007.

Results/Findings

Thirty-five articles investigated topics related to job satisfaction, job dissatisfaction, and employee turnover. These articles were published in the *Journal of Agricultural Education* (n = 16), *Journal of Extension* (n = 15), *Journal of Southern Agricultural Education Research* (n = 2), and *Dissertation Abstracts International* (n = 2). Commonly cited maintenance factors included salary, stress, hours worked, job level, and work/life balance. Motivators identified included mentoring, type of work, promotion, rewards, and recognition.

Conclusions

An agent's decision to leave Cooperative Extension may be influenced by his/her level of job satisfaction and job dissatisfaction. The reviewed studies identified a number of recurring

maintenance factors that agents were dissatisfied with, including salary and work/life balance. Fewer studies identified motivators which positively influenced the agents' level of job satisfaction.

Implications/Recommendations/Impact on Profession

Herzberg (1968) said administrators must make sure that employees' salary and other maintenance factors are sufficient. If not, then they will leave the organization. Satisfying employee maintenance factors will enable them to be motivated through their jobs.
The findings of this study revealed extension agents perceived maintenance factors were more often lacking than motivators. Based on Herzberg's theory, Cooperative Extension should be concerned about extension agents leaving the organization due to a lack of adequate maintenance factors.

Extension directors and administrators should look for methods and procedures to ensure that agent's maintenance factors are adequate. When that has been accomplished, they can identify strategies to motivate agents through their positions. Doing so may result in a considerable savings of time and money (Friedman, Galinsky, & Plowden, 1992) by reducing the number of "revolving door" positions. Also, extension agents should be more pro-active about addressing a lack of maintenance factors. Agents may decrease the number of hours they work by placing more emphasis on program planning and evaluation, rather than focusing primarily on delivery. A better work/life balance might be achieved if agents planned personal time before scheduling work events.

The implementation of these recommendations would be expected to decrease agents' stress levels and job dissatisfaction over time. Extension programming would have greater continuity if there was a lower rate of agent turnover. The benefits gained by investing in Extension's current employees may ultimately enhance Extension's ability to fulfill its mission as the educational outreach branch of the land-grant university.

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Health Rocks! as a Leadership Tool

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Introduction/need for innovation or idea

Health Rocks! is a teen taught curriculum that focuses on helping youth make wise choices. Each teen teaching team is partnered with an adult coach. This team then provides guidance for youth 8-12 years of age to experience through a hands-on education program the decision making process. The curriculum includes role-playing, journaling, games, story telling, and discussion groups about what are risks, how do we make choices and what are the consequences of the life-choices we make. The sites include housing projects, inner-city boys and girls clubs, faith-based groups, military youth programs, 4-H clubs and FFA chapters. The youth participants are diverse in race and background as are the teen instructors and their adult coaches. This curriculum is based on the successful Health Rocks! curriculum that has reached over 78,000 youth in 48 states. The Tufts University study on Positive Youth Development supports the effectiveness of the program. This curriculum model provides older youth an opportunity to engage in community youth leadership roles. The youth/adult partnership model has worked in after-school settings, community clubs, school enrichment programming, camping programs (both day-camps and over-night), and lock-ins. Those attending these sessions gain skills in teaching, working with teens as teachers, and youth/adult partnerships.

How it works/methodology/program phases/steps

The workshops orient the teen and adult leaders to the curriculum and the expectations of project staff. Here they will learn teaching techniques, Health Rocks! curriculum, how to work with youth adult partnerships, team building, and have a chance to present a lesson to become familiar with the curriculum. At the workshops, teens complete a pretest questionnaire. The pretest questionnaire includes the Leadership Skills Instrument, the Rosenberg Self-Esteem Scale, and a few demographic questions.

The project will be implemented in the teen and adults' community sites in the next four or five months after the workshops. At the end of the project implementation, posttest questionnaires will be sent to the teens that had completed the pretest. The posttest questionnaire will include the Leadership Skills Instrument, the Rosenberg Self-Esteem Scale, and an open-ended question soliciting the teen mentors' comments about the program.

Results to date/implications

The Health Rocks! curriculum can be implemented in a variety of situations. The project activities focus on using high school students as mentors to elementary students (primarily grades 3 through 6). The teens present information about making healthy decisions to the elementary students and learn that they are role models for the younger children. The program is beneficial not only the elementary students, but the teens as well. The teens showed improvement in both leadership skills and self-esteem, and the younger children learn to make healthy decisions.

According to an independent study by Lerner and Lerner at Tufts University Health Rocks! youth show an impressive resistance to peer pressure. Despite such pressure and, as well, the higher risk content within which they live, participation in Health Rocks! is linked to low levels of smoking and low levels of other risks, as well as to high levels of indicators of positive youth development, at levels equivalent to youth not having the risky context of 4-H youth.

Future plans/advice to others

Teams of teen trainers and adult coaches can implement the Health Rocks! program to their individual FFA chapters and 4-H clubs. This program will help FFA members and chapters eligible to win awards such as American Degree, Career Development Events, H.O. Sargent Awards, National Chapter Award Program, PALS, Proficiency Awards, and Supervised Agriculture Experience. A 4-H club member would be able to apply experiences from this program to their Congressional Award portfolio, National 4-H Congress record book and resume, and National 4-H Conference, as well as scholarship opportunities.

Costs/resources needed

Health Rocks! is a national healthy decision program implemented by Mississippi State University Extension in cooperation with National 4-H Council. Funding for the Health Rocks! program is provided through grants from National 4-H Council. Implementation sites are not charged for training and/or incentive items (ie: curriculum; string packs) provided by MSUES. Information and other items can be obtained through Dr. Jacquelyn Deeds, Dr. Susan Holder, Landon Summers, or Shanna Holder.

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Future Agricultural Education Teacher Academy

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Introduction and Background

The Oklahoma Future Agricultural Education Teacher Academy is modeled after a similar program at Purdue University that was presented at the 2005 National Agricultural Education In-Service held in Indianapolis, Indiana. The Oklahoma academy is a joint effort between the Department of Agricultural Education, Communications & Leadership, Oklahoma State University (OSU), the Oklahoma Department of Career and Technology Education (ODCTE), the Oklahoma FFA Alumni Association, Chesapeake Energy, and the Oklahoma FFA Association. The academy represents an Oklahoma response to the National FFA Organization's "10 x 15" initiative. The National Council for Agricultural Education has outlined eight high-priority goals; one of which is agricultural educator recruitment, including connecting students with universities and providing a bridge through the college experience (National FFA Organization, 2007). Therefore, an objective of the academy is to inform future Agricultural Education instructors of the benefits and rewards of the profession, as well as offer financial assistance during their collegiate experience at Oklahoma State University pending their future enrollment.

How the Program Works

The primary purpose of the Future Agricultural Education Teacher Academy is to encourage and promote the teaching of high school agricultural education as a promising college major and career choice. To that end, high school juniors entering their senior year are given priority. Students who attend the academy, who earn admission to OSU as an incoming college freshmen and who enroll at OSU in Agricultural Education with an emphasis on teaching, will receive a $1,000 scholarship. Criteria for selection include a sincere desire to become a well-prepared Agricultural Education instructor and maintain appropriate academic credentials to complete such goals. The applications are due in March and students are notified by mid-April of their selection. Recognition of students who were chosen to participate in the inaugural academy was announced at the Oklahoma State FFA Convention in April 2007.

A thematic approach is used to introduce five different aspects of agricultural education as a profession and a college major during the summer of 2007. Each day of the five-day agenda was focused on a different theme; selected topics included agricultural education in Oklahoma, the collegiate (OSU) experience, the science of teaching and learning, and the Team AGED concept. An introduction of college and departmental faculty, the philosophy of the AGED model, campus tours, social activities, and facilitated reflection were also elements of the academy experience. The most valuable component for both the students and counselors were the small group discussions that culminated the reflection process for each day. According to participants it was at that point, they truly began to develop the desire to pursue a career in agricultural education. Departmental faculty, representatives from the ODCTE and the Oklahoma FFA Association oversaw the details of the academy. Two undergraduate interns and four mentors were paid for their contributions while several student teachers and AGED undergraduate students volunteered their time to guide campus tours.

Results to Date

Results of the Future Agricultural Education Teachers Academy can be categorized in three areas: 1) the academy provided a joint project that allowed each partner involved in Oklahoma Team AGED to work collaboratively on the common goal of teacher recruitment. State staff, teacher educators and agricultural educators contributed to the overall success of the program. 2) 10 outstanding students were identified and provided the opportunity to learn about the profession of agricultural education and, based on student presentations highlighting the academy; students had developed a clear vision and purpose to become an agricultural educator. 3) The early career teachers who participated in the academy as mentors developed a renewed passion for the profession.

Introduction to a college major and potential career choice are primary goals of the academy. To that end, the academy participants were required to participate in a district wide teachers' meeting during fall 2007. Promoting the academy and sharing their experience as well as interacting with practicing teachers facilitated students seeing themselves as a future teacher. It is the expectation of the OSU teacher education faculty that at least 80% of the academy participants will enroll and declare agricultural education as their major in the fall of 2008.

Future Plans

In response to the success of the inaugural academy, Chesapeake Energy Corporation has committed additional resources for five more $1,000.00 scholarships. This generous contribution will allow 15 new students to experience the academy in the summer of 2008. The thematic approach will continue however, additional time will be focused on interaction with practicing teachers and OSU faculty who the students would interact with during the course of their undergraduate career. One suggestion that surfaced out of the evaluation of the initial program was to have participants develop a draft plan of study so that they would become knowledgeable about the degree plan of Agricultural Education.

Costs/Resources Needed

Future Teacher Participant Scholarships	10 @ $1,000.00 = $10,000.00
Intern and Counselor Stipends	$ 4,000.00
Meals	$ 2,000.00
On- Campus Housing	$ 880.00
Academy Shirts	$560.00
Transportation	$370.00
Portfolios	$200.00
Total	$18,010.00

To add five more students to the academy and account for estimated inflation, approximately $5,000.00 more will be needed in 2008.

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The Use of Action Research in a Reformed Pre-service Teacher Preparation Program

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Introduction/need for innovation or idea

A model of teacher education emerged, based on a learner-centered view of teaching and on the view of teachers as reflective practitioners (Schön, 1983). This model has also infiltrated the agricultural education teacher education arena. According to the National Standards for Teacher Education, instruction of pre-service students in agricultural education should "encourage the development of reflection, higher order thinking, and professional disposition of teacher candidates" (American Association for Agricultural Education, 2001, 4b).

The shift to learner-centered focus of teaching and reflection has inspired a land-grant institution to implement an opportunity for pre-service teachers to conduct action research projects as part of the pre-service teacher education program. Action research is defined as many systematic inquiry conducted by teachers for the purpose of gathering information about how they teach and how their students learn (Mills, 2003).

The reformed pre-service teacher preparation program was developed in collaboration with the Department of Career and Technical Education who serves Business Information Technology, Marketing Education, and Family and Consumer Sciences students. The purpose of this poster was to explain how graduate students in Agricultural Education and Career and Technical Education will develop and implement action research projects during the pre-service program.

Program Phases

The reformed pre-service teacher preparation program will begin summer 2008 and students will enroll in course work including a course titled Research Applications in Agricultural and Extension Education. The goal of the course is to allow pre-service students the opportunity to design and conduct classroom based research to improve their instructional effectiveness. During the course , students will develop a mock action research project to assist in comprehending basic research methods and develop skills and experience necessary to carry out an action research plan later in the program.

After completion of summer courses, during the fall semester, pre-service students will complete their early field experience. During the time devoted to the early field experience, students will observe mentor teachers, teach classes, and identify a topic for research based on their observations and/or teaching experience.

The spring semester will be devoted to several seminars and student teaching. Prior to student teaching, pre-service students will fully develop the action research proposal and meet with the teacher education faculty and cooperating teacher to present and defend the proposal prior to implementation. During student teaching the pre-service teacher will conduct the action research plan as developed.

Once the data are collected and the action research project is completed, pre-service students will develop a final report. The pre-service student will present and defend the final report to the teacher education faculty and cooperating teacher.

To disseminate the findings of the of the action research project, the pre-service student will present the project during the state agricultural teachers conference held during the month of July. In addition, the pre-service student will be required to prepare manuscripts for trade journals such as *The Agricultural Education Magazine* and/or *Techniques Magazine*.

Results to date/implications

The reformed teacher education program will begin in summer 2008 therefore no results of the program are available. However, the reformed program has allowed the department to build further collaboration with the Department of Career and Technical Education and reallocate teaching resources so no duplication of courses exists.

Future plans

Further research will be completed to answer the following research questions:
1. Does the use action research project encourage the development of reflection, higher order thinking, and professional disposition of pre-service students?
2. Does the entry level teacher continue reflecting and conducting action research during the first three years of his/her career?
3. Does the dissemination of the action research project encourage in-service teachers to conduct action research projects?
4. Do the findings of the action research projects assist in improving the teaching effectiveness of the pre-service and in-service teachers?

Costs/resources needed

No additional costs are associated with current courses and no addition of new teaching faculty. However with the merged resources, the departments have redistributed and allowed more classes with broader impact to be utilized in the reform program. The agricultural education department has requested that the conference registration be waived for the state agricultural education teachers' conference. The pre-service student will be responsible for lodging and meals during the conference.

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Developing a Comprehensive Recruiting Program: The Top Ten Things Deans / Department Chairs Should Know About Recruitment

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Introduction/Need for Innovation or Idea

According to a USDA CSREES report, demand for qualified graduates in food, agriculture and natural resources will remain strong during the period from 2005-2010 with an expected 52,030 annual job openings (Goecker, et al, 2004) During the early and mid 1990's the nation saw increasing enrollments in colleges of agriculture, natural resources and forestry, however, the nation experienced its first drop in enrollment during the 1998-99 academic year (Washburn, 2003). Following this trend, a college of agriculture at a large state university in the Midwest experienced a decline in enrolment. During the period form 1999-2006 the college experienced an overall drop in enrollment of 21.4% (University Enrollment Data by College, 2007). Because of this drastic drop in enrollment, a renewed focus of student recruitment was initiated by the college. In 2005, the college hired its first fulltime Coordinator of Recruitment Retention and Placement. With this strategic hire the college focused on building a comprehensive recruitment plan to increase student enrolment. Following the successful implementation of the colleges plan a list of the top ten things Deans / Department Chairs should know about student recruitment was developed to help underscore the importance of student recruitment and help other colleges / departments evaluate their recruitment programs.

How it Works/Methodology/Program Phases/Steps

During the initial development of the plan the college identified the major groups who were essential to the recruitment process. In addition, the college identified several different methods and strategies for obtaining information about prospective students. Finally, they identified major techniques and events that could be used to reach these students. A thorough evaluation of these lists provided the basis for the college's recruitment plan and for the eventual development of the list of the top ten things Deans / Department Chairs should know about student recruitment.

Top Ten List	Rationale
#1 Recruitment is a lifestyle, not a job!	▪ Recruitment is accomplished at the convenience of the prospective student, not the recruitment coordinator or the faculty member ▪ It happens at many and varied events and locations
#2 Cherish the relationship!	▪ You must build trust and confidence ▪ Be an active listener ▪ Know your stuff, provide factual information
#3 Surround the Prospective Student!	▪ Recognize the strength of family ties (parents and siblings) ▪ Connect with "influence agents" ▪ Identify key players (current students, specific faculty members, club advisors, athletic coaches, etc.)
#4 Assist faculty and students in "harvesting" relationships!	▪ Create an environment where the recruitment coordinator can earn and maintain the trust of the faculty and current students ▪ Support the recruitment coordinator in working with faculty and current students to make recruitment a priority
#5 Recognize that some majors require different approache!	▪ The recruitment coordinator must be willing to know all units well enough to understand and respond to their needs ▪ Know the recruitment coordinators style; be wary of those who tend to be: Mechanic, Inflexible, Unapproachable, etc.
#6 In	▪ Establish a working relationship with your recruitment coordinator

recruitment, Deans, Chairs and Faculty must both lead and follow!	based on trust and empowerment ▪ Articulate your vision for the unit to provide leadership and direction to the recruitment coordinator ▪ Remember, recruiting is a partnership, not one persons responsibility
#7 Involve the recruitment coordinator in strategic planning!	▪ Recruitment coordinators must be able to understand and articulate the vision and goals of the unit ▪ Demonstrate the importance of recruitment by making the recruitment coordinator a part of your senior management team ▪ Understand the importance to allocating budget to recruitment
#8 Quality materials and websites are essential!	▪ Recruitment is "relationship-based" and requires quality, informative, and up-to-date materials and websites ▪ Constantly critique and update your materials ▪ Don't be afraid to borrow from what others have done
#9 Make the most of your recruitment opportunities!	▪ Ideally the prospective student visits your campus, but this is not always the case ▪ Take your show on the road! Plan quality on campus and off campus events that showcase your people and program. ▪ Attend career shows, conferences and conventions. ▪ Consider visits directly to high schools and community colleges
#10 Have Fun!	▪ The relationships that you make can and should last a lifetime ▪ The students you recruit today are your future alumni and donors, take the time to start the relationship off right!

Results to Date/Implications/Advice to Others

The colleges plan was developed during the 2005-2006 academic year and fully implemented beginning in the fall semester of 2006. When the official university enrollment count was taken on day ten of the fall 2007 semester the college officially experienced an enrollment increase of 6.7% compared to the previous years enrollment (University Enrollment Data by College, 2007). This increase suggests that the college's efforts to increase enrollment are effective. There is no magic formula for recruiting students. Recruitment plans should be as varied and unique as the students they are designed to recruit as well as the institutions they are developed for. The top ten list above however, provides a general list of things to consider when developing a plan for your unique situation.

Costs/Resources Needed

If no college recruitment program has existed initial costs can be high. Development of print material and then the additional cost of production of they material can easily exceed several thousand dollars. In addition, the cost of traveling to high schools, community colleges and trade shows can quickly add up. However, there are several things that can be done that require little to no additional expense including but not limited to email correspondence, accurate and interesting websites, online chat sessions, etc. Ultimately, only the individual college or unit can decide what kind of budget a recruitment plan warrants.

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Save the Water! A Master Gardener Musical-Comedy with a Message

Pat Grace, M.Ag., Virginia Tech

1. Introduction/need for innovation or idea – "Save the Water!"

Florida's environment is unique and fragile. Great demands are being placed on natural resources to accommodate population growth and development. Of particular concern is the quantity and quality of potable water. Recent droughts have exacerbated this situation. Much of the water used in Florida is for lawn and landscape care. It is imperative that Floridians learn and adopt more sustainable methods of yard and garden establishment and care

Extension Horticulture Agents in Florida work with Florida residents teaching what has become known as "Florida Friendly Landscaping." Many of the teaching methods used include a heavy emphasis on lecture and written information disseminated via the internet, newsletters, newspapers, at fairs and other "festival" type events.

An important role of the Extension Agent is that of "change agent," That is, not only are we supposed to be educating people, we are supposed to be influencing them to make changes in their behavior by adopting practices that lead to increased environmental, economic and social sustainability. However, numerous studies by E.S.Geller, M. Finger, McKenzie-Mohr, Nemiroff, Beers & Desmarais and others have documented that education alone often has little or no effect upon sustainable behavior.

Doug McKenzie-Mohr has developed a method he calls *Community-Based Social Marketing* which draws heavily on research into the social-psychological aspects of behavior change. It uses tool that have been identified as being particularly effective in fostering change. These include the use of prompts, commitments, developing community norms and crafting messages using vivid communications tools with engaging messages and images. Save the Water! is an example of the latter. (For a full discussion of Community-Based Social Marketing please refer to *Fostering Sustainable Behavior* cited below.)

2. How it works/methodology/program phases/steps

During my tenure as Extension Horticulture Agent and Master Gardener Coordinator in Putnam County, Florida, we decided to take an unusual approach to teaching and encouraging adoption of "Florida Friendly" landscape practices. Due to a unique combination of creative abilities in our group, we chose to develop and perform a short (20 minute) live musical-comedy presentation which we subsequently named "Save the Water!"

Fifteen Master Gardeners and I began meeting regularly to select specific principles on which to focus and to write the script for the production. The principles we selected were proper fertilization, weed management and pest control. Another group of three worked on scoring the production with appropriate music to accompany the dialogue and action. Another group met to design and build the set and create the costumes. In all, twenty-four Master Gardeners were involved in the production. I served as coordinator and director. It took approximately nine months from point of conception to our first performance on March 11, 2002.

3. Results to date/implications

Save the Water! was presented on 32 separate occasions to audiences totaling over 2000. In follow-up telephone interviews with 57 randomly selected program attendees, 98% enjoyed the performance, 70% rated it "Excellent," and 26% "Very Good." In regard to practice change, 88% said they now use slow release nitrogen fertilizer and use herbicides sparingly. Ninety three percent said they now use environmentally friendly pest control methods. Volunteer hours increased more than 50% during this time period. Perhaps most significantly, not a single cast member ever missed a performance. These Master Gardeners became our most effective agents of change and goodwill ambassadors in the county and in the region. This was, by far, the most effective program I participated in during my eighteen years in Extension. The implications of this success may be significant. First of all, Extension may be more effective in facilitating behavior change by using more vivid communications tools with engaging messages and images. These changes could help protect and preserve natural resources. Secondly, we could greatly increase volunteer hours by involving them in such engaging activities. Finally, these accomplishments may help secure future funding.

5. Future plans/advice to others

The Putnam County Master Gardeners and I followed up Save the Water! with another production called "A Garden Lesson" (2004-2007). It was equally successful. I left the Extension Service in June 2007 to enter a doctoral program at Virginia Tech. My research will focus on using the arts for crafting an effective message as well as the other techniques of Community Based Social Marketing. My advice to others is to remember the importance of behavior change and strive to facilitate such change. Examine and use methods that show promise. Be creative! Take risks! .

5. Costs/resources needed

All costs for sound equipment, costumes, set, etc. were covered by the fund-raising activities of the Master Gardeners as well as donations by community groups for whom we performed. The only exception was compensation for my time which was paid for by Putnam County. In addition to funding, you must also have a group of dedicated, creative people and the ability to effectively direct their efforts. Most importantly, perhaps, is having the vision to see beyond the traditional way of doing things and the willingness to explore new ideas and methods.

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Professional Development for Tractor and Machinery Certification

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Introduction

The need for tractor safety intervention in Texas is evident. According to the National Institute for Occupational Safety and Health (2003), agriculture is the most dangerous industry for young workers resulting in 42% of work-related fatalities for youth between 1992 and 2000. Of these victims of fatalities under 16 years of age, 76% were working in a family farm setting.

According to the Hazardous Occupations Order in Agriculture (federal labor law) youth under age 14 are prohibited from operating farm tractors over 20 horsepower unless certified by a secondary agricultural science teacher or cooperative extension agent. Youth working for or under the immediate supervision of their parents are exempt from this regulation.

This professional development program was introduced to provide agricultural science teachers and extension agents with the curriculum and assessment tools to organize and conduct youth tractor and machinery certification programs in their communities.

How it Works

An awareness campaign targeting school administrators and board members began mid-June at the Texas Rural Education Association conference. Literature addressing the need for tractor and machinery safety education was distributed along with workshop registration forms. The workshops were based on the Community Lead Instructor training for the National Safe Tractor and Machinery Operation program. Agricultural science teachers and cooperative extension agents in targeted counties were invited to attend one of two summer workshops. An informational session was conducted at the summer conference for agricultural science teachers with 100+ teachers in attendance. Written requests for additional workshops throughout the state were submitted resulting in two additional workshops being offered in the fall.

A community college campus, agricultural heritage center, and two agricultural research and extension centers were chosen for workshop locations due to the access to classroom space and a tractor and implement. Workshops included an overview of the curriculum, explanation of mandatory content areas, and assessment procedures. Demonstrations of pre-operational skills and tractor driving through an obstacle course were provided to allow participants practice using the skills assessment instruments. A 50-item exam with key was also provided to participants along with a copy of the program guidelines and student manual. A CD containing the curriculum and assessment tools was also provided to each participant.

Results to Date

Two six-hour workshops were held during the summer plus one in the fall. A fourth workshop was scheduled but cancelled due to low enrollment. A total of 43 participants consisting of 36 agricultural science teachers, five cooperative extension agents, and two community volunteers completed the workshops. Requests for training from agricultural science teachers outside of the targeted areas continue, indicating a need for further workshops. Anecdotal evidence suggests that at present agricultural science teachers have greater interest in the program than cooperative extension agents.

Future Plans

Transition to a self-sustaining model for future workshops was an original goal of this project, which was primarily sponsored by the Southwest Center for Agricultural Health, Injury Prevent and Education at the University of Texas Health Center-Tyler. A meeting was recently held with Career-Technical Education (CTE) consultants from several regional Educational Service Centers regarding how they could help facilitate this transition. Plans are underway for developing a "master trainer" program that will develop a pool of trainers who can provide workshops at the Educational Service Centers on a cost recovery basis. Interest in the program is expected to increase since the certification program is now listed as an "industry-recognized certification" that may be used as a program accountability measure under current CTE guidelines.

Cost/Resources

Support for this project came from a variety of sources in varying amounts. The value of time and logistical support from the staff of the Southwest Center for Agricultural Health, Injury Prevention, and Education is not included below. However, a breakdown of general expenses for the project is provided.

Consulting fees to senior master trainer for planning and training	$5750
Conference promotional booth rentals	750
Catering/meals for workshops	1000
Facility rental (one location only)	200
Printing and copying of manuals and CDs	1250
Total	$8950
Average cost per workshop participant (n=43)	$ 209

It should be noted that Pennsylvania State University provided permission for copy and distribution of all curriculum and assessment materials for the National Safe Tractor and Machinery Operation Program. Host sites for each of the workshops provided location, tractor, and implement at no charge.

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Program Evaluation and Development in Agricultural Leadership for FFA Officers

John Lindsey, Worth County High School FFA Advisor

Jamie Stevens, Lee County Middle School FFA Advisor
Dennis Duncan and John Ricketts, University of Georgia

Introduction/need for innovation or idea

Youth leadership trainings are conducted in order to educate, equip, and encourage future leaders. As the FFA Mission states, "The National FFA Organization is dedicated to making a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education" (National FFA Foundation, 2006, p.1). Graduate students and FFA advisors, Jamie Stevens and John Lindsey, incorporated program evaluation and development with agricultural leadership training as part of a graduate leadership course at the University of [state]. In order to help students individually succeed and develop leadership potential for the upcoming year as an FFA officer, these teachers developed a leadership training program for FFA chapters in the Southwest Region of Georgia.

How it works/methodology/program phases/steps

The planning committee developed the PEDAL (Program Evaluation and Development for Agricultural Leadership Program) in order to successfully develop leadership training for FFA members. The PEDAL staff followed *Learning Your Way Through Program Development*, a step-by-step program development model distributed by Cornell University "to enhance competencies of extension educators in program planning, implementation, and management" (Cornell University Cooperative Extension, February 2005, p. --). The PEDAL staff contacted four counties in the Southwest Region to discuss their FFA program needs for leadership training. Three of the counties displayed interest in attending an area leadership training where, after completion of the training, the students would be able to: define leadership, explain the impact of leadership, develop traits of a good leader, recognize leadership opportunities in the FFA, develop a sense of team work/cooperation, and utilize basic communication skills for leadership.

The program began with an introduction into leadership, using the [state] Agricultural Education Lesson Plan Middle School Curriculum Unit 3: Introduction to the FFA. Through lecture/presentations, each educator discussed the definition of leadership, the impact of leadership, the traits of a good leader, and leadership opportunities in the FFA - (Georgia Middle School Agricultural Education Program Unit 2, May 1994). After completion of the abbreviated leadership lesson, educators and students were able to interact one-on-one. The "chapter" times gave each FFA program the chance to bond with one another and begin/complete the 2007-2008 yearly programs of activities (POA).

After lunch, students were given the chance to participate in several team building activities to incorporate sportsmanship and cooperation amongst the officer teams and build communication skills. The students were divided into teams and chapter groups. The groups worked together through participation in *Mind Tower*, *Helium Stick*, and *All Aboard*. *Mind Tower* is a strong communication building exercise that limited the students' power. *Helium Stick* is a "deceptively simple but powerful exercise for learning how to work together and communicate in small to medium sized groups." *All Aboard*, is an "activity that requires working together in close physical proximity in order to solve a practical, physical problem. It tends to emphasize group communication, cooperation, patience and problem solving strategy, as

well as issues related to physical self and physical proximity" (Neill, James, 5 March 2006). Before concluding the conference, educators and high school students worked together to present the official FFA Opening Ceremony as a way of summarizing leadership training.

Results to date/implications

At the completion of the training, both students and advisors were given evaluations. One-hundred percent of the chapter officers took the time to complete a retrospective pre/post evaluation on the quality of knowledge and leadership skills the student felt he/she possessed before and after the training. One-hundred percent of the educators completed a post evaluation on the organization, quality of knowledge and leadership skills training available, and potential for a future training. The evaluations also requested additional comments on the benefits and problems of the leadership training.

According to the results of educator and student evaluations, the leadership training was successful. Ninety-five percent of the students comprehended the objectives and purpose of the overall training showing the program objectives and goals were accomplished.

Future plans/advice to others

After consulting the advisors' evaluations, the PEDAL staff decided to make plans for continuing the leadership program for summer 2008 by inviting middle and high school chapters from a six-county area.

Costs/resources needed

The conference costs included lunch and snacks, printed material, and transportation. The first-ever PEDAL conference cost each participant nine dollars. Sponsorship by a local agribusiness could help offset the costs of future conferences.

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Internet Educational Games: Teaching Agriculture in the Digital World

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Introduction

Internet-based agricultural games give students around the clock access to agricultural learning. Developed by the Curriculum Division of the Georgia Department of Agricultural Education, Barn Ball and Ag Lib are unique instructional delivery systems that students cannot avoid. Whether student engagement is depicted by time and effort (Newman, 1986) or initiative, self-motivation, enthusiasm, or even frustration (Sandholtz, Ringstaff, & Dwyer, 2004) all forms of student engagement is occurring and is the key to the aforementioned games.

How it Works

Barn Ball is an educational game structured around agriculture and baseball. Played on an individual basis, the game has stadium graphics complete with the sights and sounds of a baseball game including a scoreboard and music. It even has an announcer. The game is basically a drill and practice activity but hopefully an activity that makes learning fun. The game player (student) is always at bat and the objective is to score as many runs as possible. To start the game a player must choose if they want to try to hit a home run, double, or single. The player is presented with a question and nine choices. The questions rank in difficulty level from high to low with the 'home run' questions being the most difficult. The student has 30 seconds to select an answer or the result is an automatic strike. When the student selects an answer the ball is thrown by the pitcher and the result is either a strike for a wrong answer or a hit as selected by the player for a correct answer. Score is kept automatically along with the position of runners on base. Adobe Flash Player, a free download at www.adobe.com, is required to run Barn Ball. Upon quitting the game a student is given their total score which may be printed to turn in to the instructor.

Ag Lib is an instructional board game that consists of agricultural terms and definitions. The game is designed to be played with a class, but it can be played individually or with small groups of four to six players. Teachers divide their class into four or more groups. With the game board projected on the screen, each group chooses a farm animal that they want to represent their group as a game piece. The farm animals and other game parts are complete with sound effects. As the 'New Word" button is selected, a student or group of students formulate their definition or select a definition from those displayed. Score is kept by moving the game pieces forward if they answered correctly. Teachers may set time limits on the questions with the build-in timer. The teacher has great flexibility in how the game is played but must explain the rules (suggested rules included) before the game starts.

Implications

Barn Ball and Ag Lib are exciting learning methods for students, regardless of their level of education or agricultural experience. They are tools to further cement agricultural concepts in the minds of students, while having fun. Teachers can assign homework or give extra credit for

participation, but this is rarely needed. Student engagement is rampant under the auspices of Barn Ball and Ag Lib. Students spend time and effort (Newman, 1986) on the game, and show initiative, self-motivation, enthusiasm, and even frustration (Sandholtz, Ringstaff, & Dwyer, 2004) when they did not do as well as they would like. Barn Ball, Ag Lib and other online learning games may be the answer for the "entertainment" generation of students. What's more, the games have even served as a unique study guide for adults seeking to pass the agriculture content certification test in Georgia.

Costs/Resources Needed

The Georgia Department of Agricultural Education Curriculum Specialist developed the aforementioned Internet games. University of Georgia students also assist in maintaining the system. There is some costs associated with implementation of the system, but there is no cost associated with student participation in the program.

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AgTube: Using Video Clips as a Pedagogical Tool to Teach Agriculture

Dennis Duncan, John Ricketts, Frank Flanders
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Introduction

AgTube is based on the popular website YouTube. Video of less than TV quality made by non-professionals has become accepted over the Internet in recent years. It seems that videos of 3-7 minutes hold student interest while longer educational videos may bore students. AgTube videos consist of short instructional segments that focus on lab activities and other specific topics to fit into instructional plans. A good teacher uses a variety of instructional methods. Attention spans are generally short and teachers must use a cadre of instructional methods available to hold student interest. The videos are simply another pedagogical tool in an educator's tool box.

AgTube gives agriculture students 24-hour access to agricultural learning, and it capitalizes on students' current interest in video. Currently, AgTube is limited to observational learning, but soon teachers will be able to use AgTube in the classroom to deliver lab directions, provide homework help, or even provide an extra content module to the lesson plan for student reflection. It is also possible for students to collaborate, in a team environment, on video productions to report back on important content. Such content creation exercises are important for engaging students (Educause Learning Experience, 2006) and for creating important discourse/discussion (Skiba, 2007).

The possibilities are endless. Such aspirations of AgTube are anything from far fetched. Consider the following, "57% of online teens create content for the Internet. That amounts to half of all teens ages 12–17, or about 12 million youth. These Content Creators report having done one or more of the following activities: create a blog; create or work on a personal web-page; create or work on a webpage for school, a friend, or an organization; share original content such as artwork, photos, stories, or videos online; or remix content found online into a new creation" (Lenhard & Madden, 2005).

Developed by the Curriculum Division of the Georgia Department of Agricultural Education, AgTube is a unique instructional delivery system that students can enjoy and learn from.

How it Works

Currently teachers can teach anything from how to make butter to the sex life of a corn plant from AgTube. Students and teachers can go to www.gaaged.org and enter AgTube from the homepage link. The AgTube clips will allow students to observe lab activities. The students get hands on experience when they complete the activity from what they learned from the video. With the popularity of faster computers, video projectors and acceptance of less-than-broadcast quality video, AgTube has been found to be a useful tool in the Agricultural Education classroom.

Implications

AgTube has several implications for teaching and learning. The ready-access of 'how-to' videos on AgTube helps busy teachers in providing instruction. The videos also help teachers who may not have expertise or feel confident in certain areas of instruction by providing expert

information and demonstrations. Additionally, just as YouTube has exploded as a media outlet, AgTube could develop as a teaching tool to be used at many levels. Elementary students could access AgTube to learn how to make ice cream without the threat of finding inappropriate information. Middle school students could preview different agricultural career options, and high school students could even develop their own instructional videos. Agricultural Education faculty at The University of Georgia are planning to add a short AgTube video production to the list of assignments in the course.

Costs/Resources Needed

The Georgia Department of Agricultural Education Curriculum Specialist developed AgTube. University of Georgia students also assist in maintaining the system. There are some costs associated with implementation of the system, but there is no cost associated with student participation in the program.

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Student Success Workshop Series: A Student Retention Strategy Facilitated Through University Collaboration

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Introduction

Research illustrates that programs and courses designed for first year college students can increase their success throughout their college career (Bureau & Rromrey, 1994). Since the 1970's the view of academic retention has began to change, institutions have become more responsible and take some of the blame (Tinto, 2006). One new practice utilized by many colleges is a freshman orientation course or seminar. The purpose of the freshman experience programs is to assist in the transition from high school to college, which can be overwhelming to some (Noble, Flynn, Lee, & Hilton, 2007). Several Land Grant Institutions across the country offer associate degree programs in agriculture and related fields. Students enrolled in these programs are rarely as academically strong as their four-year degree program peers. A student retention program for them is essential if they are to experience academic success.

The Agriculture Institute, an associate of applied sciences degree program at the university, has developed a program addressing issues for academic survival. The Agriculture Institute at North Carolina State University is promoting student success through a workshop series offered exclusively to the associate degree program. University Counselors have partnered with the Agriculture Institute to provide workshops that address the needs of first year students in the Agriculture Institute.

How it Works

Initially, students requesting re-admission after failing to complete minimum standards in their first semester were required to participate in the workshop series. The workshops were designed in response to the problems and challenges students identified in their re-admission meeting. For example, many students realized they did not manage their time very well. Others knew their extensive social life eroded their success. Other students recognized the merits of the workshops so the workshops were opened to all new students in the fall, supplementing the Institute's orientation course. The workshops are designed allowing students to address issues that could affect their academic performance. The workshops are confidential and only students are able to attend. A list of workshops is provided to the students the first week of class, and is posted on the University Counseling Center's website. Workshops are convened in small groups to allow more discussion among the members; only fifteen to twenty students can register per workshop. The workshops being conducted this semester are:

1. Fresh Start – (campus resources, goal setting)
2. Procrastination – (tips to break the habit)
3. Study Smarter, Not Harder – (test taking skills, note taking skills)
4. Safer-Smarter Drinking – (addressing signs of problem drinking)
5. Assertive Communication – Anger Management (patterns of communication)

During the workshop students learn about tips and techniques that will help their academic performance. Students are encouraged to ask question and provide examples of problems they are facing. The workshops are about an hour and a half long and are offered during the evening, after classes are finished. The counseling center tells the Agriculture Institute which students

attended so they can monitor the readmission students. The readmission students are required to attend four out of five workshops during the semester. Any Agriculture Institute students who are having trouble academically can attend the workshops.

Results to date/Implications

The Agriculture Institute is currently assessing the impact of this program. In the short term, 28 students participated in at least one workshop and 21 participated in at least four workshops. Fifty-six percent of the participants persisted to the next semester in good academic standing. Participants recognized alcohol abuse as a primary barrier to their academic success. Several students sought additional individual counseling as a result of the workshop series. One issue currently being addressed is how to encourage students to participate in the workshops during the first semester when they believe all is well. When they realize they need the workshops, it is to late and the workshops are completed.

Future Plans/Recommendations

The Agriculture Institute would like to enroll more students into the workshop series before they start showing signs of academic failure. The Institute should track the academic success of students in their first semester and communicate with the students and their advisers about the need for the workshop as a time intervention. As more students participate and the series becomes more popular with students, more workshops should be added to the program, targeting student needs. Additional workshops should be added to the end of the semester before exams, allowing students to refresh test taking skills and techniques.

Costs and Resources

The University Counseling Center is a partner and provides services and resources for the workshops. There is no cost for students to attend. The Agricultural Institute Office provides the marketing materials and manages the student's workshop enrollment process.

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Reel me in! Using Movies to Reinforce Foundations in Teaching and Learning

Amber M. Houck, Cameron C. White, Derek J. Smith, and Robin Peiter Horstmeier
University of Kentucky

Introduction/Need for the Program

Coffey and Peiter (2004) asked: is teacher education in agriculture incorporating major educational change in its pre-service program? The curriculum at this southern land grant university has been recently revised. Instructors sought to incorporate new teaching techniques which follow established principles of learning and effective teaching characteristics and engage pre-service teachers in the learning process. Newcomb, McCracken, Warmbrod, and Whittington (2004) stated that learners should inquire into subject matter and that subject matter must possess meaning for the students. Additionally, Rosenshine and Furst (1971) found that variability in teaching techniques is an important characteristic of effective teaching. Instructors resolved to incorporate excerpts from popular movies to reinforce key concepts taught in foundation teaching courses. The use of popular media has been incorporated into some educational programs on leadership (Williams, 2006), as well as teaching individuals with disabilities (Jones, 2005). With the incorporation of a new undergraduate curriculum to prepare tomorrow's highly qualified teachers, these new strategies were embraced to reach today's generation and attach meaning to Foundations of Teaching content.

Program Phases/Steps

After the significant undergraduate pre-service curriculum revision was identified, teacher educators in Agricultural Education rated innovative teaching strategies to reach learners as a high priority. Faculty identified movies which address key concepts previously identified in the course curriculum for *AED 362: Early Field Experience* and *AED/FCS 580: Foundations of Teaching*. Movies were viewed and topics identified.

Faculty identified one movie for *AED 362: Early Field Experience* - Freedom Writers specifically to address key concepts of diversity, balancing work/family, professional relationships, and conflicting educational philosophies. Students were expected to watch the movie out of class and be prepared to discuss key topics.

In *AED/FCS 580: Foundations of Teaching*, faculty utilized several movies to reinforce key foundational concepts addressed. Upon teaching the concepts of motivation, positive and negative reinforcement, and student learning styles, a 40 minute clip of Mr. Holland's Opus was played. Key aspects show how his motivation changes and how he motivates student learners, especially those students who he believes he cannot reach. As an application assignment in the last third of the course, students watched the movie Dangerous Minds. Upon watching the movie, students were required to reflect on the major concepts learned in class. Topics included: characteristics of effective teaching, diversity, motivation, rewards and reinforcement, positive reinforcement, negative reinforcement, interest approaches, and lesson planning. Students were required to write a reflection paper which analyzes Ms. Johnson's teaching and experiences in her classroom.

Results to Date

In fall 2007, the two course sequence was implemented for the first time. Agricultural Education students expressed positive comments regarding incorporating movies to highlight key concepts learned in Foundations of Teaching and Early Field Experiences. The following comments were shared about Mr. Holland's Opus:

- Mr. Holland's Opus was a great movie about professional and personal relationships.
- He demonstrated that if you are effective, then you can teach anyone.
- His personal struggles were insightful into how to balance career and family.

Regarding Dangerous Minds, students commented:

- This movie did a great job reinforcing concepts, especially getting students motivated and adapting to their way of learning.
- This movie clearly demonstrated how you can turn a student around with positive reinforcement and motivation.
- She did a very good job displaying variability and adjustment in the classroom and providing motivation and reinforcement.

For Freedom Writers, student shared:

- I feel that it does a good job bringing out ideas that can be used to create a good classroom environment.
- She struggled with family balance which worries me some.
- Her teaching methods are backed by literature on diversity

Future Plans/Advice to Others

Future plans include incorporating other movies or popular media into the curriculum. Films such as Dead Poet's Society and Mona Lisa Smile are being considered as possible selections. If a new movie is released which relates to class content, this opportunity may be used to invite students to watch the movie which will reinforce content and build stronger relationships between students and the instructor. When utilizing films, assignments should be developed which connect class content to the movie in order to maximize the learning experience.

Costs/Resources Needed

Costs of incorporating movies into courses include the price of the DVD incorporated. In addition, more time in class is needed to fully incorporate movies and to develop additional assignments that will aide the students in reflecting on the content.

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The Big City, Big Country Road Show Recruitment Model

Lacee Brianne Fraze- Texas A&M University

Introduction

Minority populations are growing rapidly and recruitment of minority students into postsecondary education is a major objective at colleges and universities throughout the United States. Large concentrations of these minority groups can be found in urban areas.

In order to promote agricultural careers to urban high school students, Texas A&M University, in conjunction with Texas Tech University, and Howard College, are conducting a series of summer workshops in 2007 and 2008, entitled The Big City, Big Country Road Show (BC2BC).

Non-traditional and underrepresented groups of students are reluctant to enter agriculture-based careers, partly due to their misconceptions about the industry (all agriculture jobs are farm-based, production-oriented, menial, and low-paying), but misconceptions alone cannot explain this reluctance. What do urban high school students in highly populated areas know about the agricultural industry? What factors impact students' decisions to enter or avoid agriculture-based career paths? When do they make those decisions? Who influences their decisions? Are non-traditional and underrepresented students less likely to enter agriculture-related careers because of cultural, economical, and/or geo-political factors?

Program Phases

Year one workshops include 11 days of interactive curriculum and hands-on activities. Days six through eleven are hands-on workshops that build upon the knowledge base gained from completion of the online modules on days one through five. Each subject area, (crises communications, photography, Web design, news writing, video production) is intertwined with current agricultural issues at the urban level. The idea of urban agriculture is complemented with industry professionals from each city speaking to the students about the opportunities available in the city with a degree in agriculture.

On day 11, financial aid and admissions personnel from various community colleges and universities meet with both students and their parents. This allows parents (who research has shown greatly influence student college and career choice) to get real answers to questions about funding their student's college education.

At the completion of the workshop, students are given several weeks to finish a final project which addresses agriculture in their city. This subject challenges students to make a tangible connection between the urban city and agriculture, while at the same time maintaining an open line of communication between the student and collegiate faculty.

College students as part of the BC2BC staff, further open lines of communication with use of popular social interaction networks; MySpace and Facebook. Interaction with college students may encourage urban high school students to pursue their own college education, in particular a degree in agriculture.

Upon completion of their individual project, students receive three hours of college credit to be redeemed upon registration at a state university.

Implications

This project provides a relevant and timely recruitment model to all human science disciplines in the food and agricultural sciences education, and/or with other academic curricula. The central feature of this project—student recruitment in peer-based, experiential settings with active participation can be adapted by and serve as a model for other institutions seeking progressive methods to increase recruitment of non-traditional and underrepresented students in academia.

Future Plans

The BC2BC Road Show will travel to El Paso, TX, Atlanta, GA, Chicago, IL, and Portland, OR. I found successful after analysis of BC2BC's 2-year pilot program, a permanent recruitment model utilizing BC2BC's innovative concepts will be developed.

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Documenting Accommodations for Special Needs Students

in Agricultural Education

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Introduction

Agricultural educators are responsible for educating all students in the least restrictive environment under the current Individuals with Disabilities Act last amended in 2004 (United State Department of Education, 2007). This law mandates that children be mainstreamed in the regular classroom. Many of these children and young adults require certain accommodations to learning activities according to their Individual Education Plan and teachers are held accountable for these accommodations or modifications. In recent studies regarding special needs students in agricultural education, Richardson (2006) found that agricultural educators felt they should be provided with more specialized information relative to employing accommodations for their students with learning disabilities. Kessell (2006) concluded that students in an agricultural education teacher licensure program be exposed to strategies to accommodate special needs students.

The authors of this innovative idea were seeking a tool to assist agricultural educators in choosing and providing accommodations for student needs students in their classroom. A review of literature was completed to determine the different ways that instruction could be modified. Six types of adaptations were chosen from the works of Cole, Horvath, Chapman, Deschenes, Ebeling & Sprague (2000). A one page checklist was developed that included the most common methods for carrying out the six types of adaptations. The checklist provides the agricultural educator with a list of choices to accommodate the student and also provides a record for accountability purposes of the accommodations that were made for each student.

How it Works

The name of the course is listed at the top of the checklist followed by the particular objective to be learned during the instructional method being modified. Also provided on the checklist are the six different ways that assignments or lessons can be modified for children who have learning disabilities. The various modifications are explained on the sheet under the headings of:

1) Input- Describes which strategies are used to teach the student.
2) Output- Describes the way the student demonstrates what they have learned.
3) Size- The amount of work the student is expected to complete.
4) Time- The amount of flexible time allowed.
5) Difficulty- How the degree of difficulty is different from the original assignment given to the class.
6) Level of Support- Describes the amount of assistance given to the learner by the teacher, student mentor, specialist, etc.

If any of these six areas are modified for the learner, it should be briefly described on the checklist, and filed for future reference of guidance counselors, parents, administration, teachers, etc. along with any modified plans, instructional activities or assignments.

Implications

One current issue in education today is accountability. Schools are being held more accountable by their communities, therefore teachers are being held more accountable by their schools. This checklist will enable teachers to provide written documentation of how students with learning disabilities are being accommodated and provide guidance to pre-service teachers in creating accommodations.

Future Plans/ Advice to others

The checklist is currently being pilot tested by high school teachers in the field and recently collected feedback has been positive. Plans exist to share the checklist thorough electronic dissemination to all teachers in the state and to provide in-service activities on its' use next summer.

In the teaching methods course in the undergraduate program, teaching faculty have used the tool to assist pre-service teachers in modifying plans for special needs students to be used in student teaching or other practice situations. The checklist served as a guide for the pre-service teachers in modifying their lesson plans and instructional activities.

Costs/Resources Needed

The cost for using and producing the checklist is minimal. A teacher will need Microsoft Word Processor software, a method of saving work (flash drive, floppy disk, computer hard drive, etc.), and a printer. All of the listed resources should be available to teachers through school systems.

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The Importance of Sharing

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Introduction/Need for Program

In 2003 The Agriculture Education Department (now the Agricultural Leadership, Education and Communications Department) at Texas A&M University developed an online resource for student teachers to upload their lesson plans so that faculty members could grade lessons and students could share their lessons with each other. This website served its designed purpose for three years, but stopped working in 2006 when the website moved to a new server and the graduate student who developed it was no longer available for technical support. While this site served Texas well for three years, there is a new site that has been developed to serve Agriculture Education Programs across the country. The new site located at www.agteacher.com is modeled after the original website, but offers more features and is designed to serve all states instead of only Texas.

Program Phases/Steps

Agteacher.com was designed with several features to allow it the flexibility to serve all states.

1. Agriculture Education by its nature is a community based program; this allows local teachers to meet the needs of a specific area, but makes it difficult to create a comprehensive list of all of the subjects that Agriculture Teachers might offer. For this reason the subject areas have been kept broad and limited to five so that lesson plans would not be "pigeon holed" into an inappropriate subject area. The five areas are: (1) Agriculture Science, (2) Agriculture Mechanics, (3) Horticulture and Plant Production, (4) Animal Science and Animal Production, (5) FFA and Agriculture Leadership, and (6) Other.

2. Student Teachers have the option of selecting the state they are located in. This allows other Student Teachers and Agriculture Teachers to search for lessons by state increasing the likelihood that they will find lessons that relevant to their area. Users who are searching for lessons on the site do not have to specify a state and can efficiently search all states thus broadening their search and the number of results they receive.

3. A Boolean Logic based search engine has been added to the website that operates in much the same way that other popular search engines such as Google work. This search engine searches for key words and assigns relevance scores to each lesson that has been added allowing users to avoid irrelevant lessons and only view the most relevant lessons that have been added.

4. A five star rating system has been implemented that allows Teacher Educators to rate lessons from one to five stars, similar to how movies are rated. When users search for lessons the search engine will return the most relevant lessons first, ranked in order of how many stars the lessons received. Yielding relevant and high quality lessons first; with less relevant, lower quality lessons last.

Results to Date

Agteacher.com was developed at the University of Georgia and was pilot tested for one semester in the Fall of 2007. Currently it is being utilized by the University of Georgia and Texas A&M University in order to increase the cooperation and sharing between Student Teachers with plans to include as many Agriculture Teacher Education Programs as possible.

Incorporating this website into the student teaching component has increased the materials available to student teachers while conducting off-campus student teaching. Additionally, this site creates an avenue to students to submit their work during student teaching so that their cooperating teacher can grade student lessons.

While not the original intention of the site, Teacher Educators are also able to view lessons without running the risk of contaminating their local computer with viruses from a student files.

Future plans/Advice to Others

In the future it is expected that the collection of lesson plans will grow and that as the site becomes better populated with lessons that their will be increased use of the site by practicing Agriculture Teachers. Also, as the number of lesson increases additional features will need to be added to the site to maintain efficiency such as pagination of results and more sophisticated search protocols.

Prior to the removal of the original Texas A&M lesson plan site approximately 1500 lessons were compiled in an Microsoft Access database. These lessons are currently unavailable due to difficulties in reconciling differences between the old site (.asp) and the new site (.php). Efforts are currently underway to migrate the existing lessons from the Access database to the new MySQL database.

Individuals interested in pursuing this type of project should be aware of limitations associated with using university resources which have a fixed location and cannot be accessed from remote locations. One problem with the original site is that it was hosted on a Texas A&M server and when the graduate student who created it left there was no way for them to continue work on the project. To avoid this with agteacher.com it is being hosted on a private server which allows remote access from any location.

Costs/Resources Needed

Agteacher.com resides on a private server with an annual cost of $84.00 to host the site; aside from that there is no other out-of-pocket expense associated with this project. The most difficult resource to secure is expertise in developing and maintaining a database driven website.

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Assisting Georgia Agriculture Teachers with Technology Integration

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Introduction/Need for Program

As technology integration has increased in education the National FFA Organization has also adopted new technologies to assist with everything from distributing Career Development Event information to collecting membership information from Agriscience Teachers. Each year Agriscience Teachers neatly organize their FFA rosters and electronically submit them to the National FFA organization and see no additional benefit for their efforts. Once the FFA Roster has been submitted it is available for download as an Excel document from PeopleSoft (https://access.ffa.org/), but very few teachers utilize these files because they cannot see a benefit to downloading them.

A Georgia Agriscience Teacher was able to take his knowledge of Microsoft Excel, Access and Word to create a set of files that greatly increase the usefulness of the FFA membership roster. He created a set of files that allows other Agriscience Teachers to download their FFA roster and quickly generate personalized letters, mailings, and envelopes using the Microsoft mail merge feature. He then bundled these files into a .zip file and made them available to Georgia Agriculture Teachers for their use.

Program Phases/Steps

The initial phase of this project was the development of the files that utilize the data from the National FFA Website. One Microsoft Excel, one Microsoft Access, and five Microsoft Word files were needed to manage the data pulled from the National FFA Website. The Excel and Access files hold the student data and serve as the data source for the merges with Word. The five Microsoft Word documents that merge with the student data are: (1) Welcome back to school.doc, (2) Field trip.doc, (3) Banquet letter.doc, (4) Special event.doc, and (5) Envelope merge .doc.

After the initial files were created and released to the teachers an immediate need was realized for how-to manuals to accompany the files. After these were created and distributed there were additional needs for instructional videos to assist teachers who were not familiar with the technology and terminology being used.

Results to Date

To date 15 agriculture teachers across Georgia are utilizing these files to generate letters, mailings, and envelopes. Some problems were encountered early with regards to how the files were formatted and security settings for the Excel file. As more teachers use the files more adjustments and corrections are being made to improve their usability for the “average” Agriculture Teacher.

Future plans/Advice to Others

In the immediate future there are many additional uses for this project; as teachers develop more letters those letters can be shared among the Agriculture Teachers so that the are not duplicating efforts. Also, several teachers have expressed an interest in moving from Microsoft Excel to Microsoft Access as it offers a greater range of tools that will allow them to complete more complex task. Also, The Agriculture Teacher responsible for developing this set of files is currently developing a set of instructional videos using Camtasia so that he can better illustrate how Agriculture Teachers how to can use these files.

While not in the foreseeable future there has been discussion that these files and the entire merge process should be turned over to the National FFA Organization. Allowing Agriculture Teachers nation wide to log on to the National FFA Website (http://www.ffa.org), click on "letters" and create customized letters directly from that website. Teachers have cited that this would be faster, easier, and would allow for updates to the files to occur much quicker so that they would not have to email them to each other every time a change is made.

Costs/Resources Needed

There is no immediate or foreseeable cost associated with this as they files were developed as part of a graduate class assignment and they are being offered free to teachers.

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Arkansas Biodiesel Research, Demonstration, and Education Project

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Introduction/need for innovation or idea

Recent concerns about global warming, diminishing petroleum reserves, and increasing petroleum prices have lead to renewed interest in biofuels. University of Arkansas Agricultural Systems and Technology Management faculty (AEED Dept.), UA Campus Facilities personnel, and the Arkansas Soybean Promotion Board (ASPB) are cooperating in an applied research, demonstration and education project evaluating and publicizing biodiesel as an alternative fuel for compression-ignition (diesel) engines. Seventeen Kubota RTV900-GT 4WD utility vehicles, operated by UA Campus Facilities, are being used in the research and demonstration components of this two-year project, which began in July 2007.

2. How it works/methodology/program phases/steps

In the research component, the vehicles have been randomly assigned to be fueled with either petroleum diesel (8 vehicles) or B20 biodiesel (9 vehicles). Appropriate fuel labels have been developed and placed on the fuel caps (and other appropriate locations) of each vehicle to prevent accidental cross-fueling. The existing fueling and maintenance record logs have been modified to collect operating and fuel consumption data.

Baseline engine oil samples were taken at the beginning of the project and will be taken during each scheduled maintenance event. Spectroscopic laboratory analysis of the metal content in these oil samples are providing comparative data on levels of engine wear by fuel type. In addition, both baseline and periodic exhaust tests are being conducted to compare the levels of oxides of nitrogen ($NO_{x)}$ in the exhaust emissions of vehicles fueled with diesel and B20 biodiesel. NO_x contribute to smog formation and are difficult to control in diesel engines because reduction in NO_x tend to be accompanied by increases in particulate emissions and fuel consumption (Knothe, Gerpen, & Krahl, 2005, p.19).

These vehicles are being tracked for two years in order to gather data for meaningful comparisons. Statistical comparisons will be made between petroleum and B20 fueled vehicles on the following measures:

- Hours of operation per gallon of fuel consumed (hrs/gal)
- Fuel cost per hour of operation ($/hr)
- Maintenance costs per hour of operation ($/hr)
- Repair costs per hour of operation ($/hr)
- Wear metals (ppm) based on engine oil analysis
- Exhaust emissions (NO_x ppm).

The demonstration component of the project centers on the on-campus public visibility of the seventeen Kubota RTV900-GT 4WD utility vehicles. These vehicles are highly visible on all parts of the main university campus. Project visibility has been enhanced through the development and use of prominent signs attached to each vehicle.

The wording of the display indicates that the vehicle is a part of: **University of Arkansas Biodiesel Project**. The ASPB logo is incorporated into the vehicle display and the ASPB is being recognized for its financial support of the project.

In addition to normal use and visibility on campus, the vehicles are being displayed in "high traffic" areas for maximum public visibility during Arkansas athletic events. The demonstration portion of this project has resulted in state-wide media coverage.

Project personnel have developed materials for a one-hour educational presentation on biodiesel as an alternative fuel for compression-ignition (diesel) engines. The materials are being targeted toward the general public. The project PIs will make a minimum of four educational presentations during the two-year project. Potential audiences include: Extension Service personnel, educators, civic groups, fleet managers, producers, etc. Presentation materials are also being posted on the departmental website for public access by educators, Extension personnel, and others.

3. Results to date/implications

During the first three months of the study, vehicles fueled with B20 had significantly ($p<.05$) higher fuel efficiency than vehicles fueled with D2 (0.717 h/l versus .552 h/l). There was no significant difference ($p>.05$) in corrected NO_x emissions levels between vehicles fueled with B20 (259 ppm) and vehicles fueled with D2 (298 ppm). This 2-year study will provide useful, real-world data on the fuel efficiency and NO_x emissions of compression-ignition utility vehicles fueled with B20.

On August 1, 2007 a press conference was held on the campus of the University of Arkansas publicly launching the biodiesel project. There have also been many interviews with many different news and media outlets. These interviews have been directed in educating the public about biodiesel and the biodiesel project.

4. Future plans/advice to others

Future plans include collecting a full two years of data and then sharing the results through popular and scholarly media outlets. Also, educational materials developed will be available to educators. Other states can seek funding from their own Soybean Promotion Boards for funding in the area of biodiesel research and education.

5. Costs/resources needed

The cost for this biodiesel project is $18,400 per year over the next two years. The Arkansas Soybean promotion board has provided a grant to cover the costs of the project. The University of Arkansas is providing the seventeenKubota RTV900 utility vehicles that will be tested over the two year project.

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Computer Simulation of Statistical Concepts: A Visual Method for Enhancing Student Learning

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Introduction

Many graduate students do not like statistics courses! Kirk (2002) surveyed students enrolled in a graduate statistics course and reported that responses to the stem statement, "When I realized that I had to take this [statistics] course, I . . .," included: "wanted to cry," "wanted to die," and "knew I'd have to take it twice" (p. 12). According to Burton (2003), graduate students often view the required statistics course(s) as "a tedious exercise in mastering techniques that are rapidly forgotten after the conclusion of the course" (p. 151).

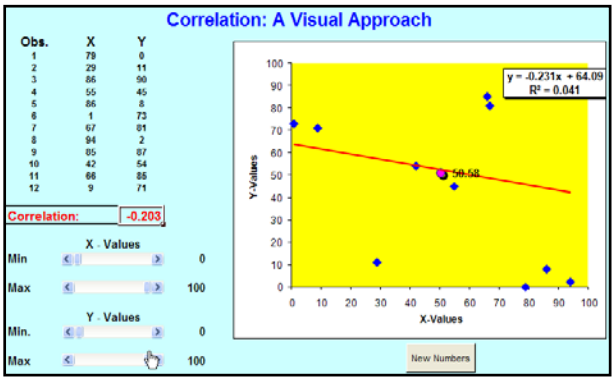
The Department of [Name] at the University of [State], teaches its own graduate statistics course, AGED 5473 – Interpreting Social Data in Agriculture. In an effort to help students learn, understand, and retain important statistical concepts and procedures, several visually-oriented spreadsheet simulations have been developed. This poster describes three example simulations: bivariate correlation, statistical estimation of population parameters, and one-way *ANOVA*. (Note: Attendees will be able to interact with all simulations.)

How It Works

Each simulation was developed using the Excel© spreadsheet program. Excel© has an extensive library of pre-programmed statistical and mathematical functions, excellent graphics and formatting capabilities, and an easy-to-use macro recording procedure, making it an ideal program for developing statistical simulations.

Several features are common to all of the simulations. First, values for each variable are automatically generated using the RANDBETWEEN function. Slider bars are used to set the upper and lower limits from which the random numbers are generated. This allows for manipulation of the distribution(s) to illustrate different outcomes. Graphs are automatically generated to illustrate the specific statistical concept. Macros, executed by clicking on labeled buttons, are used to generate new sets of random numbers. All formulas, functions, and charts automatically update based on these new random values. Formatting features are used to enhance the appearance of each simulation and to focus attention on key concepts. Finally, each simulation is protected so that only the input cells can be altered.

Bivariate Correlation



This simulation (Figure 1) provides a visual introduction to the concepts of bivariate correlation. The CORREL function calculates the Pearson correlation coefficient (r) between the randomly-generated values of X and Y for 12 paired observations. A scatter plot of these values is produced and the prediction equation and regression line are displayed. Students easily grasp how the size and sign (positive or negative) of the correlation coefficient relates to the slope and the goodness-of-fit of the regression line. Restricting the range for one (or both) values(s) shows how homogeneity of variance limits the size of obtained correlations.

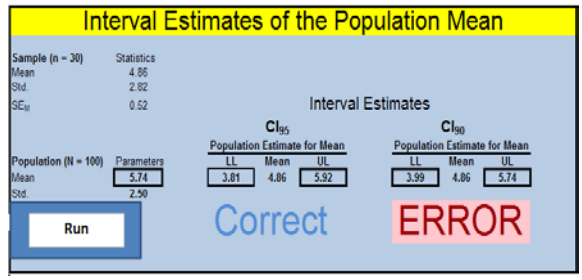


Figure 1. Bivariate correlation simulation

Interval Estimates of the Population Mean

This simulation draws a random sample (n = 30) from a finite population (N = 100) and displays the population mean, the sample mean, and the CI_{95} and CI_{90} interval estimates of the population mean. Conditional formatting is used to indicate whether or not the confidence intervals actually contain the population mean. This simulation is helpful in assisting students to understand confidence levels, confidence intervals, statistical estimation of population parameters, and probability.

One-Way Analysis of Variance (ANOVA)

ANOVA procedures work by partitioning the total variance into two components: "within groups" and "between groups" variance. When the between groups variance is sufficiently large relative to the within groups variance, a significant treatment effect exists. This simulation allows both the within and between groups variances to be manipulated in order to observe the effects on the obtained F statistic and on the decision to retain or reject the null hypothesis.

Figure 2. Interval estimates of the population mean

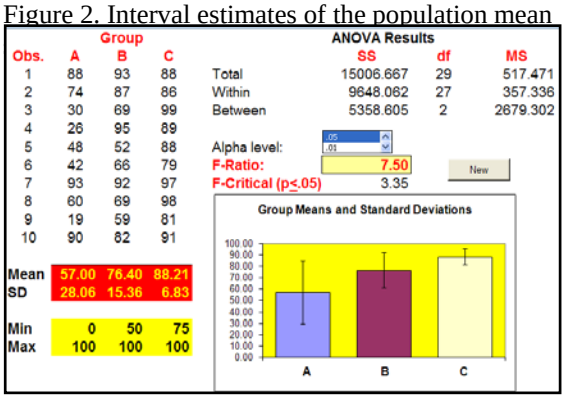


Figure 3. One-Way ANOVA simulation.

Results to Date

To date, 12 simulations have been developed and used in AGED 5473 – Interpreting Social Data in Agriculture. Topics range from describing distributions to factorial *ANOVA*. Each simulation has the same basic format and appearance. Most have taken approximately one or two hours to develop. Student reaction to use of the simulations in class has been positive, with students commonly indicating that the simulations help them to "see" the conceptual logic of the statistical procedures. Simulations can be downloaded from [URL provided.]

Advice to Others and Costs and Resources

Agricultural educators who teach statistics should consider the use of spreadsheet simulations. The cost of development is negligible (except for time) and the benefits to student understanding are large.

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LEI: Leadership Education Institute for Faculty in Colleges of Agriculture

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Introduction and Need for Innovation

Fritz et al, noted that a compelling result of their study "was that the agricultural leadership faculties were primarily traditional agricultural educators with specialized training in leadership" and therefore, "the opportunity for enhanced training in leadership is created" (2003, p. 21). Although agricultural leadership education programs are on the rise, they have not been around long enough to create a faculty properly equipped in the specific intricacies of agriculture and leadership. Fritz et al found that the average leadership course offerings in colleges of agriculture have only been around for an average of 17 years (2003). To meet the need for agricultural leadership courses, current agricultural faculty will need to become versed in the discipline of leadership education. With the already great demands on faculty, this is difficult to do on an autonomous basis. The Leadership Education Institute (LEI) sought to unify, formalize and dramatically improve agricultural leadership education instruction in colleges of agriculture across the nation by offering interested faculty a rich and in-depth leadership education program steeped in agriculture, debate and dialogue.

How it Works: Program Purpose and Objectives

The purpose of LEI was to bring together agricultural educators interested in teaching leadership and provide them with a sustainable network for learning about leadership education, best practices and research in the leadership education discipline, and opportunities for continuous development in agricultural leadership education. Developing agricultural faculty in the area of leadership education has far reaching implications throughout agricultural colleges and the industry impacted by those colleges. The project objectives were: (1) to provide professional development to faculty in colleges of agriculture responsible for delivering undergraduate leadership curriculum; (2) to support faculty in aligning leadership instruction and curriculum with current research and best practices in leadership education; (3) to develop a sustainable network of faculty in colleges of agriculture teaching leadership coursework; and, (4) to disseminate contemporary models for leadership instruction and curriculum to colleges of agriculture.

Results to Date

Ten faculty representing colleges of agriculture across the nation were selected to participate in the institute. LEI Fellows participated in three face-to-face multi-day workshops in addition to campus visits to host institutions. Workshops were designed to provide opportunities for the participants to work with experts in leadership education from other universities and colleges. Two of the workshops were offered as extended pre-sessions to the Association of Leadership Educators (ALE) national meeting and a third workshop was organized as a fall retreat for LEI participants. Telephone interviews were used to assess participant needs and current leadership development activities. Deductive analysis was performed based on the questions asked to the interviewees (Patton, 2002). Utilizing Lincoln and Guba's (1985) modification of content analysis, units of data were grouped into codes which, ultimately,

became the themes of the findings. All of the LEI fellows saw the LEI experience as a way to increase their leadership knowledge. Fellow 8 stated that "while I have a limited exposure to leadership instruction in my background, it's not a great deal, so I saw LEI as an opportunity for me to be better prepared to be an instructor in that particular part of our program." This same fellow went on to tell the researcher that his "PhD is in ag education but my focus is in teacher ed…and I do play that role here but I also play the leadership role too." Seventy percent of the fellows answered that they had had limited to no participation in any leadership education development. Fellow 1 shared that he would describe his professional development in leadership as "limited to none." Of those who had participated in professional leadership development, one had attended a Covey workshop, two were members of the Association of Leadership Educators and had attended that conference and participated in the development that the association provided, and Fellow 3 noted that he had "been to some of the workshops in leadership" provided by AAAE.

Implications

As Fritz and Brown (1998) note, the discipline of agricultural education must continue to work to increase leadership knowledge for those who teach leadership courses but do not have any formalized training. LEI participants agree that faculty in agricultural education are still being asked to teach leadership without a strong foundation in leadership. In order for leadership education to continue to grow in departments of agricultural education, more leadership development and education is needed for those professors who may not have specialized in leadership education during their PhD programs. Fellow 8 states, "here I am in a new program, carrying on this responsibility [of teaching leadership], yet I am not really prepared to do it. At the very least, I hoped that I could continue without doing any harm, but it should be more than that. I want to be able to be effective in terms of leadership development and teaching leadership for that degree in our program".

Future Plans

Future plans include: finalizing the program evaluation including assessment of program objectives, disseminating final results to both agricultural educators and leadership educators, and seeking funding to expand the project to additional faculty.

Costs and Resources Needed

LEI was funded through a USDA Higher Education Challenge Grant ($282,321) directed by faculty at Oklahoma State University, the University of Georgia, and the University of Nebraska. Funds were used to support partial travel costs of LEI Fellows, provide faculty salaries, support graduate assistants, provide leadership libraries to LEI Fellows, and fund an external evaluation of the project.

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Freshman College Orientation Courses in Agriculture: Enhancing Student Engagement

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Introduction

Transitioning from high school to college can be a difficult time for many individuals. For many students this is the first individual freedom and responsibility they have experienced. As a result, many students are ill prepared to deal with the transition and leave school without receiving a degree. Students exiting college without a degree result in an economic cost to the university as well as the community and state. As a result, there is a need to improve the retention of students entering college. There are many ways universities attempt to improve student retention including freshman welcome week activities, peer mentoring, short term orientation courses, and extended orientation courses. All these activities can be helpful to first time students and may provide the connection needed that sustains through their college experience. Research indicates that there is a relationship between retention rates and students who participate in extended orientation courses (Davig & Spain, 2003; Maisto & Tammi, 1991; Sidle & McReynolds, 1999; Fidler, 1991). Specifically, Hyers and Joslin (1998) revealed that student performance in a freshman orientation course were actually better predictors of academic achievement and retention than S.A.T. scores or the students high school rank.

Development of Retention Program

The University of Tennessee at Martin began a campus wide freshman retention program through the development of the Student Success Center (SSC) on campus. The primary goal of SSC was to improve student retention and graduation rates. The primary method used was the development of discipline specific freshman orientation courses titled General Studies 101. First year students are advised during university orientation to register in the GENS 101 course. Currently over 90% of all incoming freshman enroll in the semester long course. The program has been a success as retention rates have increased for participating students. Student academic performance is also higher for participating students as compared to students not participating in the course. The GENS 101 courses have a dedicated faculty member for each course as well as two student PEP Leaders (Peer Enabling Program Leaders). The PEP leaders are chosen from a pool of successful students in a discipline specific agriculture field. First year agriculture students (FYAS) enrolling at UT Martin select between agricultural business, animal science, agriculture production and natural resources management general studies courses. The courses focus on increasing engagement between several groups: FYAS and faculty; FYAS and peers; FYAS and upper classman mentors; and FYAS and the community. The two major factors that drive student retention at UT Martin is the engagement between FYAS and faculty and FYAS and peers.

Particular emphasis is placed on enhancing the interaction between the PEP leader and the students. This has a twofold positive impact. First, PEP leaders gain valuable leadership and mentoring experience. Secondly, FYAS are more open to sharing issues that with their PEP leader than with a faculty member. Students view the PEP leaders as a better person to understand the issues they are facing and as experts in navigating the college experience. Faculty engagement with FYAS is also critical to the success of the program. Students feel more connecting with their chosen major right from the start. This connection helps to reinforce the decision to choose a particular major in college and the steps needed to be successful. GENS

101 faculty serve as the door keeper and guide to the rest of the university. The difficult step for faculty is to maintain a balance in their relationship with students between the role as faculty member and as a friend. The administration spends considerable time and resources through training opportunities designed to assist GENS 101 faculty members. The support of university administration is essential for the success of program at UT Martin.

Results and Implications

The freshman orientation program has been active in its current format for the past 6 years. Since its inception, the program has shown increasing numbers of participating students. Fall 2007 currently has 120 students enrolled in GENS 101 agriculture specific sections. Initial data reveals that retention to the second year of college has improved for agriculture students. As students learn valuable college survival skills and become more engaged with faculty, peers, the university and the community they will be more confident and adjusted to their new lifestyle as college students. The transition to college is impacted positively from the GENS 101 experience.

Resource Needs and Future Plans

General studies 101 for agriculture students will continue to be integrated into the curriculum at UTM. Students cite that the relationships that are developed in the course are essential to their success. A successful orientation program does not just happen over night. To be successful universities must have faculty willing to interact on a personal level with freshman. Essentially, the faculty member takes on the role of mentor and guide through the maze of the first year experience. Certainly, not all faculty members are comfortable taking on this role, so it is critical that faculty selection for these courses is voluntary. Other needs for this type of program include the support of the university administration. This can be accomplished through faculty release time or additional teaching stipend. As with most programs, success depends on having faculty dedicated to leading students, not just teaching them.

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Using Movies to Teach

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Introduction/need for innovation or idea

The main purpose of educators is to create a learning environment that will promote learning. Educators need a variety of methods and tools to enhance the educational process and experience. The "entertainment value" of movies is well known. Movies have been used to teach such diverse psychological topics as counselor education, psychology and law, cognitive psychology, developmental psychology, social development, family systems theory, abnormal psychology, and medical ethics (Boyatzis, 1994; Gladstein, & Feldstein, 1983). In order for students to learn they need to be actively involved in the learning process. Movies incorporated correctly into the classroom environment can be a meaningful and helpful educational tool. Classes that use movies can engage the learner to use higher level thinking skills. Teaching with movies can highlight concepts covered in the curriculum as well as allow students to make meaningful connections to their lives and the curriculum. Movies often offer insights or other perspectives that not even the instructor had thought about or discussed. Movies can add significance to lessons by contributing sounds and images that can not be communicated in a classroom discussion alone. Students praise films concerned with ethical and personal conflicts, portrayed by realistic characters, who deal with fundamental issues like integrity or trust (Buchanan & Hofman, 2001).

How it works/methodology/program phases/steps

The main point to remember when using a movie in a lesson is to show the movie with a particular objective in mind.

1. **Concept:** The instructor needs to develop a concept they wish to expand upon using the movie. If the instructor wishes to develop creative thinking skills a movie depicting the lead role thinking "out of the box" or "bucking the system" would be appropriate. If models of leadership and followership are the expected out come, a movie depicting good and bad leaders as well as how followers react to them would be appropriate.
2. **Break it down:** The instructor should lead a discussion on the movie as they would a piece of written literature. Discussion should include roles, attitudes and beliefs of the main characters, including having the students analyze how the characters act and react to different situations throughout the movie. This can also be termed, "critical viewing."
3. **Go deep:** Explore the movie for more than just the entertainment value. Analyze the movie taking into consideration theme, costumes, setting, musical elements, sound elements, etc.

Results to date/implications

Movies that have been shown in the leadership courses so far have included:
1.) Pay it Forward, 2.) Over the Hedge, 3.) The Five People You Meet In Heaven

An important aspect to remember is the instructor must make a point of making the students analyze the movie for the desired outcomes of the curriculum or objective. The instructor needs to guide the discussion after the movie to assist the students to realize what they saw and heard

and how it relates to the lesson/curriculum. Movies help to encourage discussion on different aspects of the lesson.

After viewing each of the different movies in class students have been able to discuss the following leadership concepts:

Pay it Forward - Can an individual truly make a difference, Responsibility by individuals, The *Power* of an individual

Over the Hedge - Leadership roles, Leadership styles, Followership

The Five People You Meet In Heaven - Personal impacts, Random acts, Perception of events

Future plans/advice to others

Some tips for using movies in your course include:

1. Be sure you preview the movie. Make sure there are no inappropriate words, phrases, or scenes. By discussing selected scenes or characteristics of the movie before viewing the movie uncomfortable situations may be prevented.
2. Give discussion questions (worksheet) to the class before viewing the movie. This will allow the students to look for the concepts as the movie progresses.
3. Depending on the concept you are trying to promote, showing clips of the movie instead of the entire movie may be best.
4. You may have students view the movie on their own instead of using class time. You can have a copy of the movie available for them to check out. You can also provide a viewing time out of class time when the film will be shown.
5. Stop the movie and discuss the lesson as the movie progresses.
6. A movie shown at the beginning of the course can be used throughout the course as a reference in regards to different parts of the curriculum.

Costs/resources needed

A typical movie needed for a lesson can be rented at a local video store or purchased rather inexpensively. Universities often have the movie which can be checked out at no expense.

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Utilizing A Tablet Computer to Capture Evidence for Performance Based Assessment.

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Introduction

One of the on-going tasks in any agricultural Education teacher preparation program is to conduct assessments of student teaching performance and provide evidence of student performance. The use of electronic collection of assessment data, and the use of electronic portfolios are key to many teacher education systems (Buzzetto-More and Ayodele Julius Alade, 2006).

In the Illinois State University Teacher Training Assessment System, a series of assessment tools are utilized. The primary data system is the electronic portfolio utilizing Livetext®. Student teachers are required to post evidence of teaching performance and that demonstrate the various moral and intellectual virtues defined under the Illinois State University system, *Teaching the Democratic Ideal.*

To provide evidence of achievement of these virtues, students are required to post evidence such as lesson plans, activity sheets, exams, and various documents and materials. Another important component to this process is the observation reports produced by university supervisors and cooperating teachers. In the past the agricultural education program used hard copy reports for performance reviews of the student teachers. The use of paper and pencil scoring rubrics, while convenient in the classroom and less distracting to the students and student teacher, made it difficult to share results with the student teachers readily in electronic format to allow them to quickly incorporate that information into their assessment portfolio. In order for students to utilize these in their electronic portfolios, the process required the university supervisor take the hard copy reports back to campus, convert them to electronic format and return them to the student teacher to post on Livetext®. This process often proved cumbersome and difficult to return reports to the student teachers in a timely fashion.

In an attempt to streamline the process, various electronic data collection techniques were explored. A search for electronic techniques that could be effectively used was undertaken. Use of a laptop computer was considered, however, the addition of a laptop and the supervisor typing away during the class was felt to be distracting to the students, and to the student teacher.

One potential solution was to use a tablet computer capable of converting hand-written notes to text in an expedient fashion, which could then be easily stored, shared with the student and easily posted to Livetext.

Methodology

The author began the exploration by researching tablet computer capabilities online and visiting retail outlets to discuss with vendors the capabilities of handwriting recognition and conversion to a text format. Initial thought was to capture hand written notes in cells and a spread sheet allowing documents to be converted to an easy to use electronic format. Initial consultation with campus computer support personnel yielded names of faculty members on campus who were using tablet computers in a similar fashion. Meetings with those faculty yielded insight into capabilities of the tablet computers in these applications.

Initial discussions and trials convinced the author this was a viable alternative for the agricultural education teacher training assessment data collection. A tablet computer was obtained and the teaching assessment rubrics were converted to a table format in a MS Word document. Where

possible, the cells were automated or pre-populated to speed the process of completing the forms under field conditions.

Results to date

Since our program only places student teachers in the spring semester, initial testing was done in the teaching methods course during in-class practice teaching sessions. The same rubric used in student teaching was utilized in this data collection practice.

Initial use demonstrated an efficient form of data collection. The ability to and complete the form, save it and transfer it to the student's storage device proved fast and efficient.

Some of the potential drawbacks involve maintaining the speed of data collection. While still faster than typing on a laptop, it was deemed slightly slower than paper and pencil versions. Errors in converting the hand written input to text were minimal, but present. Some experimentation yielded insight into certain letters and combinations of letters that proved problematic. However, the information in the text provided enough guidance to allow accurate post- facto editing.

Future Plans

The initial observation from the trial utilizing this technology during classroom practice teaching sessions, revealed strong possibilities for application in student teaching assessment. It also revealed areas needing modification to the current procedures. During a search of related literature, a few similar projects were identified. One of those projects incorporated direct wireless web access of Livetext to produce real-time data upload of the feedback to the student's portfolio (University of Findlay, 2005).

Costs/resources needed.

The computer purchased for this project is a Gateway E-155C, running Microsoft Windows Vista Business operating system and MS Office 2007. The system was up and running for just under $2000.

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eLearning as a Tool for Faculty–Development Prior to Delivering Learner–Centered Workshops in International Settings.

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Introduction

Cano, Brown, Ewing, Velez, and Whittington (2006) noted that many actions need to be taken when working with foreign learners. In the fast–paced, high technology world of today, the ability to work through a learning module to help one think about the processes of development and delivery of an international workshop is of great value. Further, using this module in a variety of situations could make this a valuable tool and offer a new way to process learning environments. This self guided instructional tutorial will allow learners to develop knowledge about an international environment by walking them through the processes one needs to obtain before leaving the country.

How it Works

The computer–based international preparation module is designed as an interactive tool that promotes higher–level thinking skill for the learner, greater freedom for selecting the international situation, the ability to plan an effective workshop after developing a context, and the ability to conceptualize the learning situation. This eLearning tool will provide several sections based on the faculty member's knowledge of the country or situation to be encountered. Faculty will work through a series of scenarios and be asked to think critically about what they know, what they think they know, and what they want to know, aiding in the development of higher order thinking on Bloom's taxonomy.

Faculty will be guided through the process of developing a plan to provide an active–learning workshop, tailored for their learners. The module will not draw conclusions for learners, but act as a guide through the process. Faculty could visit this module two to three times before becoming comfortable about their international workshop.

Working through the module will bring the learner through the thought processes of developing a workshop centered on the knowledge of the learners, potential barriers, and known information about the country or agricultural context in which the workshop will take place. The module will act as a guide for instructional development.

The international preparation module will take the learners through the following:

- Background information — understanding the background and situation for the country in which the workshop is being conducted, the overall project, and the participants of the workshops is important.
- Planning — having a clear vision for the goals and objectives of the workshops is important. It allows one to narrow the focus and carefully plan the workshops.
- Flexibility — although identification of goals and outlined our content in advance, it is important to remain flexible for many factors which may arise.
- Language — effectively translating the true meaning of an idea from one language goes beyond simply translating words, particularly when using oral communication.
- Translation — the language difference will provide some interesting experiences. When using translators, it is helpful to have people who are familiar with the content being presented.

- Interpersonal connections — making connections with the workshop participants aids in the overall effectiveness of the workshops.
- Thinking about the learners — are they social learners, inquisitiveness, innovative, conservative?

Thinking through the process of the criteria above will help the workshop presenter focus on the desired goals of the workshop, instead of focus the situational factors identified above.

Implications

The international preparation module is designed to increase higher–level thinking skills for faculty. Faculty should be better prepared for curricular decisions and provide cohesiveness across colleges of agriculture. Faculty will become more comfortable in international development and study abroad programs.

Future Plans

Development of the international preparation module, with input from stakeholder groups to help develop a web–based version, is currently underway to serve faculty members traveling abroad. In the future, the module will serve two additional groups of individuals, including undergraduate student–teachers seeking international experience as well as agriculture extension training as they focus on learners at the local level internationally. In the case of agricultural education, extension majors and/or agents, the module would serve as a template for an in–class assignment. As students work through the module, they should learn to develop the curriculum around the learners and not the content. Dealing with potential language barriers in selected countries, cultural differences and customs, as well as the roles of males and females in the country, all must be considered. The focus of undergraduate learning should be development and application of skills utilized in their classroom in the United States or their local county extension office; thus bringing out the theory of multiple intelligences, social cognitive theory, as well as social constructivism.

Resources Needed

College web-design professionals and undergraduate student involvement will be needed in development of this eLearning tool. Creators will have had previous experience with foreign travel and leading workshops with foreign participants. Uses of appropriate learning theories are applied where necessary.

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Increasing Multicultural Diversity in Agriculture Through Educational Partnerships

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Introduction

Many research studies have indicated a recurring problem regarding the recruitment of Hispanic students into agriculture and life sciences related academic programs. A major reason of this problem is a negative perception of the Hispanic population regarding agriculture (Nichols & Nelson, 1993).

Hispanics have become the largest and fastest growing minority group in the United States (Leon, 2003). This ethnic group represents approximately 13% of the country's population and accounts for about one-half of the population growth in the U.S. (Schmidt, 2003). Schmidt further indicates that, overall, Hispanics are the least educated racial group, with just 6.6 percent of the total enrollment at four year universities and only 11 percent over 25 years of age holding a bachelor's degree. Of this 6.6 percent of the total Hispanic enrollment, very few are enrolled in agriculturally related degree programs.

To remedy this problem of low Hispanic student enrollment in four-year degree programs, the Department of Agriculture at Texas State University, San Marcos has developed a joint project with primarily Hispanic serving institutions. The project will establish linkages between two high Hispanic population community colleges, Laredo Community College (LCC) and Southwest Texas Junior College (SWTJC), and the Department of Agriculture at Texas State University, a four-year institution. The project will create opportunities for Hispanic and underrepresented students to complete degrees in the many disciplines of agriculture and meet the growing need for qualified personnel in the agriculture-related jobs with both public and private sectors.

Methodology: Program Phases/Steps

The first initiative of the project has been to sign a joint admissions agreement to allow students to be concurrently enrolled at LCC, SWTJC, and Texas State University. Texas State University has secured funding and is in the process of equipping a classroom with teleconference equipment to provide a link to LCC and SWTJC. Agriculture courses in various specialty areas will be taught starting in the Fall 2008 at Texas State University and be made available to students at LCC and SWTJC, thus allowing the students an early linkage with curriculum, facilities, and professors of Texas State University. The project will provide scholarships to help defray the cost of enrolling in the courses.

Additionally, students and parents from LCC and SWTJC will be invited to Texas State University in the Summer 2008 academic year to familiarize them with available resources, financial aid, scholarships, and facilities. During their second and third years, students will take

experiential learning trips to the LCC Environmental Science Center, SWTJC wildlife area, and Texas State University Freeman Ranch. Activities will include environmental and soil science labs, animal science/wildlife labs, and range/pasture lectures. To enhance their positive learning experience and to avoid alienation, all students will participate in and share with each other these activities. Approximately 10 scholarship recipients will be placed in summer internships with State and Federal agricultural agencies.

Expected Outcomes

The project is expected to benefit all participants, Texas State University, Laredo Community College (LCC), Southwest Texas Junior College (SWTJC), and community at large, as follows:

1) Increasing enrollment of Hispanic students in agricultural sciences at Texas State University and, at the same time, fulfilling its goal of becoming a Hispanic Serving Institution.
2) Developing and implementing new instructional strategies for all three institutions.
3) Increasing the number of internships with agriculture agencies at State and Federal levels.
4) Strengthening the relationships between community colleges and the university.
5) Changing the Hispanic students' perception of careers in agriculture.
6) Developing and/or reinforcing relationships and cultural sensitivity for Hispanic and Non-Hispanic students at the university and the community colleges.
7) Educating and training a qualified labor force to meet growing needs in this area.

Future Plans/ Advice to Others

Unless its funding is renewed, the project in its current form is expected to last three years. Each year experiential learning activities will be planned and summer activities for selected scholarship recipients will be conducted. Parents will be fully involved in their children's transfer to a four year university. We expect that the current partnership will remain intact after the completion of the project. Efforts will be made to secure additional Texas Community College partnerships in the future.

Costs/Resources Needed

The project was funded by the United States Department of Agriculture – Hispanic Serving Institutions Initiative. Funds will be used for student scholarships, student travel to and from the three campuses, teleconference equipment for Texas State University Department of Agriculture, student and parent room and board (dorms) during the summer information sessions, faculty and staff salaries, printing and advertisement costs, and personnel costs for end of year evaluations. Majority of the monies will be utilized for student scholarships to defray the cost of enrolling in the courses.

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An 1862–1890 Partnership to Deliver Agricultural Education

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Introduction

In 1890, Congress passed the second Morrill Act with a purpose of establishing colleges focused on the agricultural and mechanical arts for African-American citizens in the south. Geographically, these institutions span 17 states with the northern–most being Delaware State University and the western–most being Langston University in Oklahoma. Although each state has one official 1890 institution, Alabama is generally credited with two, Alabama A&M University and Tuskegee University. Thus, the total number of colleges usually recognized as 1890 Land Grant institutions is 18.

According to a recent supply and demand study in agricultural education (Kantrovich, 2007), only five of the eighteen (28%) 1890 institutions reported having programs in agricultural education [Florida A&M University, Fort Valley State University (Georgia), North Carolina A&T University, Prairie View A&M University (Texas), and Virginia State University]. Fort Valley State University and North Carolina A&T University were the only two reporting that they had graduates qualified to be agricultural education teachers, with five graduates each. So, in 2006 only ten graduates from the eighteen 1890 Land Grant institutions were qualified as agricultural education teachers. Further, the extent to which 1890 Land Grant institutions are engaged in facets of agricultural education other than teacher education (leadership, communications, extension, etc.) is unknown.

Prairie View A&M University (PVAMU) is the 1890 Land Grant institution in Texas and is in the same university system as Texas A&M University (TAMU), the 1862 Land Grant institution in Texas. PVAMU had a teacher education program in place with one teacher educator, but student enrollment had dwindled. When that teacher educator retired, PVAMU elected to take the program in a different direction by hiring an agricultural educator with expertise to develop other types of agricultural education programs (i.e., leadership and communications). In contrast, PVAMU's sister program at TAMU had more than 20 faculty specialized in multiple facets of agricultural education. Geographically, the two campuses are 50 miles apart.

Thus, the situation that led to this project was in place. PVAMU had a struggling teacher education program and was trying to expand non–teaching agricultural education programs. TAMU had a comprehensive agricultural education program with ample faculty capacity. Accordingly, a partnership between the two universities seemed like an amenable solution to enhance agricultural education at PVAMU. From PVAMU's perspective, this partnership would provide capacity and expertise to help expand agricultural education at PVAMU and increase student enrollment in the Department of Agriculture, Nutrition, and Human Ecology. From TAMU's perspective, this partnership would provide opportunities to engage more students of color in agricultural education (broadly defined) and expose students of

color to graduate school opportunities in agricultural education at TAMU. From the perspective of many involved in this partnership, a long–term goal would be for more students of color to consider teaching agriculture at the secondary level.

Methodology

During the spring semester of 2007, faculty and administrators at TAMU and PVAMU addressed the possibility of partnering to enhance agricultural education at PVAMU. After much discussion, it was decided that the logical first step would be to offer a course jointly at PVAMU to extend PVAMU students' opportunities in agricultural education. In essence, a "survey of agricultural education" course was developed that covered human resource development, multiculturalism, leadership, technology–mediated instruction, teacher education, extension, communications, and agricultural law. The agricultural education faculty member at PVAMU served as the instructor–of–record for the course and provided the day–to–day leadership and coordination for the course. Additionally, with the assistance of other PVAMU faculty members, he recruited students into the course. One faculty member at TAMU served as the coordinator on that campus and recruited faculty members from TAMU to provide instruction for the various topics.

Results to Date

During the Fall 2007 semester, AGHR 4413 (Special Topics) was offered at PVAMU with 10 students enrolled. Throughout the semester, two PVAMU faculty/staff, one external faculty, and eleven TAMU faculty co–taught the course. Early feedback from PVAMU students, PVAMU faculty, and TAMU faculty has been positive. Observations from the authors and informal student feedback indicate that the PVAMU students are interested in additional opportunities to learn about social science opportunities in agriculture. TAMU faculty have related that the opportunity to teach students of color in an 1890 institution was a personally rewarding professional development activity.

Future Plans

Plans are underway to offer a similar course during the Spring 2008 semester. Additionally, faculty and administrators from PVAMU and TAMU are preparing a proposal to seek external funding to aid in establishing a formal partnership between the two universities to continue the expansion of the partnership.

Costs

At PVAMU, the course was part of the normal teaching load of the faculty member in agricultural education; normal class–related expenses were incurred. At TAMU, faculty members engaged in co–teaching the course on a volunteer basis. The Department of Agricultural Leadership, Education, and Communications provided funds to compensate faculty travel of approximately $500. Approximately $100 in teaching materials was used by TAMU faculty and these funds came from the normal operating budget.

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